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Long & Brenchley - Suppression of Weeds (1949)  
Low & Lurois - Students' Handbook of  
Fertilizers & Soil (1949)  
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## INTRODUCTION.

IN 1910, a booklet entitled "Notes on Gardening in Malta," compiled by E. N. P. (Captain E. N. Price, R.N.), was printed at the office of the *Daily Malta Chronicle*, Valletta. This small work consisted of 68 pages in small 8vo, and included a Calendar of Gardening Operations by me, reprinted from the *Daily Malta Chronicle*, as well as short articles on Roses, Pelargoniums, Carnations, Chrysanthemums etc., by various local growers. This booklet, which at the time of its publication, was received with favour by gardeners and amateurs, has been long out of print, and another edition had become necessary.

Some months ago, I was approached by Captain E. N. Price, with a view to revise the Calendar, and to add some further cultural hints which would improve the booklet which it was proposed to reprint. The Calendar required only a slight revision, but it was obvious that in order to render the book more useful, it was necessary to recast it, and to extend its scope by including additional information on various items of gardening interest. However, it was also necessary for various reasons to keep the volume well within the limits of a small manual, and consequently the technical directions for such gardening operations as pruning, grafting, budding etc., which are amply described in most standard works on Horticulture, had to be left out.

Therefore the scope of this book is rather to furnish to gardeners, and particularly to amateurs newly arrived in these Islands, reliable cultural directions in harmony with the local conditions of soil and climate. The various items are dealt with

very briefly, but it is hoped with sufficient clearness, in separate chapters. However, it is regretted that owing to the tyranny of space, such fascinating subjects as Landscape Gardening, Rock-gardens, Water and Bog gardens, Mosaiculture, Forcing of flowers, fruits and vegetables, Orchid-growing etc., had to be omitted altogether.

It is hoped that this small manual will go a long way to assist the beginners and the new-comers to these Islands, as far as possible, to avoid disappointment and discouragement, as a consequence of the many failures to which are liable all those who have to learn in the hard school of their own experience.

In every country, the progress of gardening is a sure index of civilization and prosperity. But it is something more. In the short span of our pilgrimage on earth, it is the duty of everybody to strive to leave the world for his successors in a better condition than he found it, and of all the various callings there is perhaps none which is so conducive to this result as the gardener's art, broadly understood in all its branches. Moreover, we pray God to give us our daily bread, but of his goodness he gives us a great deal more than that; and when we see the beautiful flowers and luscious fruits in the garden or on our table, it is just that our hearts be filled with a sense of thankfulness towards our Bountiful Master, who gives to his labourers so much over and above the living wages.

J. BORG.

*Valletta, 21st December, 1925.*

## THE CLIMATE.

THE climate of the Maltese Islands is subtropical. The summer temperature during the months of June—September usually ranges from 25°C. to 30°C. in the shade. Occasionally there is a rise to 32° or 34°C. for some days in July or later. Very exceptionally the thermometer marks 36°C. for a very few days in August or September. Owing to the close proximity of the sea, the difference between the day and night temperatures usually amounts to about 3°C. and rarely exceeds 5°C. The climate is therefore very equable. In winter the temperature is usually about 10 to 14°C. and rarely goes down to 3°C. or less for a few days in January and February, the range of the day and night temperatures being often greater than in summer. Snow never falls, but sleet and small bits of snow may fall on very cold days in January and February, when the temperature may fall to almost freezing point for a short time in the morning. But these occasions are rare. Heavy frosts occur but seldom, but there are usually a few frosty mornings in January—March, which cause injury to field crops and to garden plants. Hail may fall during the rainy season, but is more frequent in February—March. Very rarely there are showers of destructive hail of large size, which may happen at any time during the rainy season, especially in October—December. The average rainfall is about 50 c.m. or may reach 80 c.m. The rainy season commences in September, during which month there may be one or more good showers, but the heaviest rainfall usually takes place in October, November and December, January is often more or less dry, and February is ordinarily a wet month. Rain becomes less frequent in March and April, a good shower towards the close of March or early in April being considered as very beneficial to the crops generally. After April rain becomes rare, but there may be showery weather in May. It is exceptional to have rain in June, July and August. The first decade of October is considered the right time for the regular commencement of the autumnal rains, the year being considered as late when the rains are delayed until the end of that month. With the commencement of the rainy season, after the pro-

longed drought and heat of summer, vegetation starts into active growth and the landscape soon assumes a green appearance which continues until May, and afterwards the countryside gradually acquires again the dreary and desert-like appearance of summer, unrelieved except on irrigated lands, or where the dry-farming methods permit the growing of such unirrigated summer crops as cotton, tomatoes, melons and water melons, maize, sesame, and dry-farmed cauliflowers and cabbages. Most wild spring annuals and perennials start germination soon after the first autumnal rains, and certain perennial flowering plants such as *Leontodon Taraxacum*, *Ranunculus bullatus*, *Colchicum Bertoloni*, *Crocus longiflorus*, *Scilla autumnalis*, *Narcissus serotinus*, *Spiranthes spiralis* etc., flower at the same time. With the advent of spring, that is in March—April—May, germinate the wild summer annuals and perennials, which with the exception of those species which habitually live on irrigated land, are so constituted as to thrive well during the prolonged summer drought.

We find that the cultivated annual and perennial herbaceous plants are likewise divisible into two classes, viz: the spring flowering plants which are natives of subtropical and temperate lands and must be sown in autumn and winter, to flower in spring; and the summer flowering plants, which are mostly natives of intertropical or tropical regions, and must be sown in March—May, to flower during the summer and early in autumn. Our winter, the period of rest for leaf-shedding trees and for most trees and shrubs, is also the period of active growth for many annuals and herbaceous perennials; on the other hand summer is the period of activity for summer plants, but it is also a period of comparative rest for most trees which are ripening their fruit, and a period of absolute rest for the spring-flowering annuals and perennials.

As regards the comparatively scanty rainfall and its distribution, the same characteristics of climate are noticeable throughout the entire subtropical zones in both hemispheres; the rainfall being highest in the tropical zone and lowest in the desert zones which are intertropical, or next to the tropical in both hemispheres. The rainfall rises again in the subtropical zones and still more in the temperate zones, being comparatively greater in the corresponding zones of the southern hemisphere, apparently owing to the greater area of the oceans.

## II.

### THE SOIL AND THE WATER-SUPPLY.

THE soil of a garden is necessarily in close dependence on the geological formation of the place. The reader who wishes to have a comprehensive knowledge of Maltese Geology may turn to the introductory notes on Geology in my Descriptive Flora of the Maltese Islands, now being printed at the Government Press. Here it is sufficient to mention that the strata of the Maltese Islands belong to the Tertiary and the Quaternary Age. The lowermost layer is the Lower Coralline Limestone which belongs to the Oligocene period. The rock is mostly a hard crystalline or semi-crystalline limestone, with pockets and seams of red soil of excellent quality. In those places where the Lower Coralline forms outcrops, the fields and gardens have a soil of a deep red or lively red colour. The next layer consists of the Globigerina formation, belonging to the Lower Miocene period, and contains also pockets and seams or fissures of deep red or light red soil, of good quality. In some parts where the uppermost layer of the Globigerina formation consists of a very friable carbonate of lime, the red soil is replaced by a white or whitish soil of poor quality. The Globigerina formation extends over the eastern two-thirds of the Island of Malta, and over most of the western two-thirds of Gozo. The third layer belongs to the Middle Miocene period, and consists of beds of Marl and Clay, which partly spread over the underlying Globigerina beds and therefore often appear to be much thicker than what they are. In these localities the soil is clayey, deep and moist, difficult to work in wet weather, and unless properly tilled in spring, becoming baked and deeply cracked in summer. Over the layer of Marls and Clay there is usually a thin layer of greensand, mostly greenish in colour, but may be yellowish, reddish, or black. This layer is rich in glauconite and phosphates, and is used occasionally as potting material, when a light loose soil is required for such plants as *Hydrangea* etc. The uppermost layer is the Upper Coralline Limestone, identical in structure and origin with the Lower Coralline Limestone, but usually much softer and



often granular or saccharoid. It belongs to the period of the Upper Miocene, and like the Lower Coralline contains many pockets and seams of red earth of good quality, but usually of a lighter colour and more loose or sandy.

The Quaternary age is represented by alluvial deposits of some extent, which form the rich lands at Ghain Rihana, Burmarrad, Marsa, Puales, Ghain Tuffieha, Fiddien etc., and also by ossiferous deposits in caves and fissures such as Ghar Dalam, Maghlak, Ta Gandia etc., but these last of course are of no importance to the horticulturist. The soil of the alluvial deposits varies according to the nature of the ground from which the debris is carried down by the action of rain-water. At Fiddien the soil is a mixture of clay with some red soil derived from the clayey layers and the Upper Coralline around that basin. At Ghain Tuffieha (Manicata) the soil is red, the locality being included between two escarpements of the Upper Coralline. At Ghain Rihana close to Musta the soil is reddish, having been brought down from the neighbouring heights of the Lower Coralline; lower down the soil becomes reddish-white or clayish, owing to the mixed debris of clay, red soils and whitish soils brought down by the valleys of Ghain Rihana and Wied Kannotta. For the same reason the soil at Marsa is of mixed nature; but the alluvial soil at Ghain Znuber is red, being formed exclusively from the red soil of the Upper Coralline.

Except where there has been an alluvial accumulation in the plains or valleys, the soil is mostly shallow, usually not more than one metre in depth, although in some places there may be a depth of 2 metres or more. However, for the cultivation of fruit-trees, for vegetables, and for field crops and flowers, the depth of the soil is perhaps less important than the nature of the subsoil. A good red soil, hardly more than 60 c.m. in depth, evenly spread on the moist rocks of the Upper Coralline formation, or on the Globigerina beds, or even on the more tender and porous upper layers of the Lower Coralline, on which the roots of plants will spread out and make use of the natural moisture of the rock, will give better results than land with similar soil on an impermeable or dry subsoil. Such lands are usually made ground, that is the rock has been levelled and terraced where necessary, the hard impermeable crust covering

the surface chipped off, if not wholly at least at regular intervals, so that the moisture can rise up by capillarity and spread over the surface of the rock. The pockets and depressions are filled up with stones over which is laid a layer of finely chipped stones or rubbish 15 to 30 c.m. deep, which would afford adequate drainage and at the same time maintain a suitable degree of moisture for the roots. Over this layer, the soil is spread evenly to a depth of not less than 50 c.m., but if sufficient earth is available, the thickness of the layer of soil may be increased to 1 metre or more. In these Islands it is rare to find lands perfectly level, and where they exist the subsoil is sufficiently porous to meet the ordinary requirements of drainage; but on clayey soils even if naturally slanting and apparently drained, it is often necessary to make arrangements for drainage, particularly if the land is irrigable, and this operation usually becomes unavoidable if it is intended to plant trees. The usual method of constructing open ditches 60 to 100 c.m. deep which also do duty as storm-water channels, constructed in parallel lines from an upper to a lower level, at a distance of from 20 to 60 metres apart, appears to give satisfactory results in the case of field crops on unirrigated land. But on irrigated land, and where trees are being planted, the distance between two parallel ditches should not be more than 8 or 10 metres. This arrangement would cause a wastage of surface and would impede the proper tillage of the soil, and therefore it is more advisable to construct ditches 1 to 1½ metres deep, and only 5 metres apart, with a loosely covered stone drain at the bottom, or with earthenware drainage pipes, loosely fitted, filling in again the ditches so that the land may have an even surface.

Whenever the soil is too loose and sandy, or too clayey and stiff, or too whitish, friable and stony, it is often necessary to amend it in order to bring it to the required degree of physical and chemical composition for the cultivation which it is desired to undertake. Sometimes the soil becomes too sandy because the finer particles have been carried down on the subsoil by the action of irrigation water, or have been partly washed off the land. In that case it is necessary to trench the land very deeply so as to bring up to the surface the lowermost and richer layer of the soil. Should the soil be uniformly of a loose and sandy nature, it can be amended by adding good virgin

red-earth, or powdered clay, or both, in the proportion of one or two cubic metres to every 50 square metres. A clayey soil can be amended by the addition of sandy red soil, or road dust, in the proportion of one cubic metre to every 25 square metres; a whitish stony soil can be amended by the addition of one cubic metre of red soil and one cubic metre of powdered clay to every 50 square metres of surface. The addition of an abundant allowance of sea-wrack (*alca*), or other stiff material, to a clayey soil during the operation of trenching helps to keep the land in a loose and porous condition, and to prevent the cracks of the subsoil which are always dangerous to the root-system of plants.

From the foregoing remarks it is clear that our soils are all more or less calcareous, and even the clayey soils and the stiff red soils contain much lime. In the whitish soils, and also in the lighter red soils, the percentage of carbonate of lime may amount to over 70 %, sometimes up to 90 %, or more. Hence many plants which dislike lime (calcifugous), and only thrive in siliceous or acid soils, cannot be expected to thrive well in these Islands. All our spring water, and especially the deep level spring water, is more or less heavily charged with lime. Rain water, collected in covered tanks or reservoirs, also contains carbonate of lime derived from the road dust, or brought down the rain conduits. Hence certain plants, which would not object to our climate, are seriously handicapped even if cultivated in pots with leaf-mould or with siliceous soil, for the reason that each time they are watered a small quantity of lime is added to their soil, which in a comparatively short time becomes dangerously charged with lime, the plant acquires a sickly appearance and succumbs sooner or later. In exceptional cases, where the soil is very well drained, and where the lime is mostly in a crystalline or semicrystalline form and not readily soluble, the plant or tree may thrive fairly well and continue in a flourishing condition for many years. But if the lime has a saccharoid or cretaceous texture, flaky or friable and easily soluble, the plant will soon die off, particularly if the drainage is at all in a faulty condition. Many failures of imported plants and seeds are due entirely to this cause, which is too often ignored by our gardeners, with the result that the same plant is imported again and again, and of

course invariably fails to establish itself, and the failure is attributed to any other reason except the true one. ; Thus it is useless to try to grow here the many beautiful Conifers which adorn the gardens and villas of Italy, where they grow on siliceous soils or on volcanic deposits. Many greenhouse plants, such as Codiaeums (Crotons), Caladiums, *Olea fragrans*, etc. suffer severely from the same cause. The Chestnut, the Cork-Oak, many American Oaks, the Beech, the Birch etc. are easily affected by a calcareous soil, so also many species of Eucalyptus and other Myrtaceae, Azaleas, Rhododendrons, South African Heaths etc. die off in our soils, where they should thrive well if it were only a question of climate.

The subjoined is an analysis of 6 samples of soil made at the Ministry of Agriculture, Cairo.

### SOIL ANALYSES

1. Clay-white soil Notabile
2. Globigerina (red soil)
3. Upper Coralline, Nadur
4. Clay soil from Wied Kasab (Gozo)
5. Gozo soil from Globigerina formation
6. Upper Coralline, Melleha. [tion Wied Kasab (Gozo)]

	1.	2.	3.	4.	5.	6.
	% of dry soil.					
Loss on ignition.	3.18	10.82	4.39	4.49	3.68	6.82
Insoluble and Silica.	8.43	47.82	14.96	25.02	12.62	53.31
Oxide of Iron & Alumina	3.64	16.72	8.12	12.02	5.59	16.10
Lime.	46.56	12.82	39.65	30.95	42.41	11.07
Magnesia.	.38	.97	.35	.78	.76	.67
Potash.	.32	.90	.63	.22	.11	.30
Sulphuric Acid.	.19	.33	.09	.30	.32	.35
Phosphoric Acid.	.51	.73	.28	.19	.15	.17
Carbonic Acid.	36.50	8.60	31.20	24.86	34.01	9.14
Chlorine.	tr.	tr.	tr.	tr.	tr.	tr.
Nitrogen.	0.137	.308	1.129	.089	.115	.151
Rough Mechanical Analysis.						
Carbonate of lime.	82.99	19.6	70.9	55.2	75.7	19.8
Coarse sand.	.3	5.7	.3	3.5	.1	2. —
Fine sand and silt.	1.2	35.—	4.8	5.3	4.—	28.6
Fine silt and clay.	15.6	39.7	24.—	38.—	20.2	49.6

The percentages of phosphoric acid and nitrogen are variable, and the above samples do not represent virgin soils, but soils which have undergone cultivation. The percentage of lime is always high, and it is generally supposed that there is no deficiency of phosphoric acid.

No gardening is possible without an adequate provision for watering, at least during the dry season on from April to September. After the first autumnal rains, and until the close of March, it is often possible to rely entirely or almost entirely on the rain, with its occasional showers in autumn and in March, as during the winter proper there is little evaporation, and a slight shower goes a long way towards satisfying the needs of growing plants. But with the longer days of March, the warmer sun and dryer atmosphere, watering becomes often an absolute necessity. Wherever it is possible to lay a water-service, this of course should be done, as it affords a ready and effective method of watering. Moreover, by means of hydrants and a garden-hose it is possible not only to irrigate, but also to spray regularly the growing plants, which will thrive all the better for this treatment. Where it is not possible to have a water-service laid to all parts of the garden, it is necessary to construct reservoirs or covered tanks, in which water could be stored during winter for summer use. These reservoirs should be of sufficient capacity to store and hold all the water required during the dry season. As a rule, a storage capacity of one cubic metre for every 10 square metres of surface will be found sufficient, but of course everything depends on the nature of the cultivation which it is proposed to start. For a kitchen-garden, or for a banana plantation, about twice the quantity of water will be required; but for an orange-grove, or part-irrigated vegetables which mature early in summer or are planted late in summer and mature in autumn or winter, the above mentioned storage capacity will be enough. The water requirements of a flower-garden are very variable, some flowers requiring more frequent irrigation over a prolonged period; but on the whole a storage capacity of one cubic metre for ten square metres of surface will meet ordinary requirements.

### III.

#### TILLAGE. MANURES. MOULDS.

**T**HE best way to prepare the land for the reception of annuals or herbaceous perennials, as well as preparatory to laying out as kitchen-garden, is to perform the operation of deep digging or trenching, and at the same time manuring. The operation of trenching is a laborious one, but is the best form of tillage for ordinary purposes. The operation is commenced at the upper part of the field or garden, by excavating a trench 60 to 80 c.m. wide, and about 25 c.m. deep; a layer of manure is laid at the bottom of the trench which is digged with an ordinary hoe either before or after spreading the manure. The soil is then returned to the trench with a broad hoe, in regular heaps close to each other. The next trench should be parallel to and contiguous with the first, and in its turn after digging the bottom and manuring, the soil is filled in by drawing the earth in heaps with the broad hoe, from the third trench, and so on. This operation ensures a thorough tillage of the vegetable soil, and adequate and uniform manuring, and also the aeration of the lower layer of the soil which is brought up to the surface. Trenching in the kitchen-garden and in the flower-garden should be performed in alternate years or every third year, and is supplemented with surface dressings of manure, when required. In the case of field crops it is usually performed every third or fourth year, and in the case of the orange-grove or the orchard it is done every fourth or sixth year, according to circumstances, the orange-grove being trenched in autumn or spring, and the orchard in autumn or winter. In these cases the deep digging serves also the purpose of superficial root pruning.

Weeding is necessarily associated with light digging or harrowing. In the case of the flower-beds or beds of vegetables this light work can be done with a garden rake of 3 to 5 prongs. In the case of the orchard and grove, the digging should be heavier and must be done with an ordinary hoe. Deep hoeing is necessary in the grove and orchard at least once a year, viz: in April or May. The object of this deep hoeing in May is to loosen and break up the surface soil, so as to

prevent cracks and preserve the moisture. So also, with the same object in view, the soil should be broken up and reduced to a fine tilth by means of a light hoe or rake, after each watering, before it becomes too dry and cracked. A surface dressing of manure should be always followed by some hoeing, to dig in the manure and mix it with the soil.

Except in the case of sandy or very loose soils, no tillage whatever should be done when the soil is in a wet conditions so as to stick or clod on the hoe. Red soils and clayey soil, are particularly liable to suffer from this cause, and if worked in a wet condition will clod and harden in a manner as to render them unfit for the proper development of plant growth, throughout the winter season; and this objectionable state of the soil will not improve until the soil has been thoroughly soaked again by the autumnal rains, after going through the long summer drought. This rule has the same importance in the case of plants in pots, and for obvious reasons it is more difficult to correct this bad condition of the soil in the case of pot plants than in open ground cultivation.

In trenching and manuring the orchard or the orange-grove it is important not to push the surface root-pruning to an injurious extent, as it frequently happens with inexperienced gardeners who in their anxiety to perform their work well, are apt to forget that root-pruning is a delicate operation to be performed with the greatest care. The tree feeds and grows by means of the deep roots, but the function of developing and maturing the fruit is usually assumed by the superficial roots, and if root-pruning is at all excessive, the probable result will be that the tree will develop great vigour of foliage, but will remain comparatively barren for one or two years, until the superficial roots have grown again. It is therefore necessary, particularly in shallow soils which are liable to dry too much and therefore must be frequently watered during summer, with the consequent development of a powerful superficial root-system, not to deepen the trench beyond 15 or 20 c.m., and the bottom of the trench need not be too much disturbed or deeply digged.

The expense of trenching and manuring is generally a heavy one, and in the case of orchards and groves, a compromise

is frequently reached to save expense. A circular trench is constructed around the tree, commencing at a distance of about 50 c.m. from the trunk of the tree and made sufficiently wide to reach as far as the outer branches of the tree all round. In this case the trench should be 20 to 30 c.m. deep, according to the nature of the soil, and a liberal supply of old and well-rotted manure spread evenly along the bottom of the trench and lightly digged in. This method of manuring is best done in autumn, and usually gives satisfactory results, although of course it cannot compare in thoroughness with the whole surface method.

Our gardeners have to deal mostly with organic manures, using the chemical manures or chemical fertilizers usually when they have to push on the growth of certain plants. The advantages of chemical fertilisers are too well known to require here more than a passing reference. By their means the gardener is enabled to give to his land exactly what it requires and no more, and is able to apportion the requirements to each successive crop. On the other hand organic manures, besides the elements and salts required for plant life, contain also a large percentage of organic matter or humus, which imparts very valuable physical and chemical properties to the soil, and therefore does not represent a useless dead weight, as is too often represented. The presence of decaying vegetable or animal matter in the soil stimulates the action of nitrifying bacteria, and therefore is an additional source of fertility. It should be also pointed out that soils rich in humus are capable of absorbing and condensing considerable quantities of atmospheric moisture, and the porosity imparted to them by organic matter give them greater power to absorb the rain and the dew, and to retain the moisture thus absorbed. This property of humus, and especially of decaying vegetable matter accumulated in the soil, explains the important function of forests to absorb the rain water, to prevent the formation of disastrous torrents and to foster the continuance of a moist soil and a moist atmosphere, favourable to the development of vegetation. Except when intended for trenching for field crops generally, and for many kitchen vegetables, the organic manure must be applied in a well-rotted and fermented condition, as



otherwise it will ferment in the soil in contact with the growing roots of plants, and may prove dangerous to most plants, or even disastrous in the case of trees.

The principal organic manures in use by our gardeners are the following:

a) Cow-manure. By this is meant chiefly not the manure from the cow-house at the farmstead, which is generally too much mixed with vegetable matter, straw etc. from the bedding material of the shed or stable, but rather the manure obtained from the fattening sheds where store cattle are being fattened for slaughter, and in this case the cattle being fed on rich food, the manure obtained is of much richer quality and contains little admixture of bedding material. Cow manure is suitable for all soils, but chiefly for red soils, and is not liable to ferment too much in the soil, even if used when not yet completely rotted. For this reason, it is especially recommendable when the object chiefly in view is not a rapid action, but rather a slow one, prolonged over a considerable period.

b) Horse manure, including the manure of other equines. This manure is rich in quality, but is usually much mixed with bedding material. It is apt to ferment with great activity, and is preferable where a rapid action is required, particularly on clayey or stiff soils, but should not be used for flower-beds, beds of vegetables, and plants in pots, unless thoroughly rotted.

c) Pig-manure. The manure from the pig-sty is most rich in nourishing material for the plants, and its action is at the same time strong and prolonged. It is little liable to fermentation, and is suitable for all sorts of soil. It is rightly preferred for the cultivation of flowers and vegetables, and for plants in pots, most plants answering quickly to its action, and the growth soon becomes wonderfully vigorous. It can be applied even in excess without much fear of danger, provided that the plants are kept well watered. Unfortunately it has two drawbacks; it has a very evil odour, and being rather scarce, its price is often as much as 50 per % more than that of good cow-manure.

d) Town refuse-manure. The refuse and sweepings from towns and villages are usually carted into a farmstead and

heaped up in yards, where the heaps are visited by the poultry and rabbits of the farm, and any stray pigs and goats which may be about the place. This manure is usually of poor quality, but is capable of very active fermentation, which however soon subsides. It is used chiefly for trenching on whitish soils, and the first crop raised upon it usually develops very well, but the manure soon ceases to act, and after the first year, surface dressings become necessary. Its price is about two-thirds that of cow-manure.

e) Sheep and Goat-manure. The manure from the fold, if not too much charged with straw and bedding material, is of excellent quality, ferments slowly or none at all, and has a prolonged action. It may be classified as second in quality after pig-manure. Pure sheep-manure constitutes the best material for liquid manuring, the manure being dissolved in water, allowed to stand for a few hours, and applied to the flower-bed, to the vegetable-bed or to plants in pots. This liquid manure is not apt to cause trouble, even if given rather in excess, and is particularly recommendable for light and sandy soils.

f) Manure from the poultry-yard, and especially that of the dovecot, is very rich in nitrogenous substances and in phosphates. It is therefore very powerful, and is dangerous to use before it is properly fermented and rotted. At all times it should be applied sparingly and in repeated doses. It is also very powerful as a liquid manure, but should be used with caution. This manure is useful to foster the growth of seedlings in the seed-bed, to foster the development of the foliage in certain vegetables, such as lettuces, spinach etc. and it is applied as liquid manure to flowering plants in bud, in order to improve the size and appearance of the flower.

g) Guano is chiefly a phosphatic manure, but contains also a large percentage of nitrogenous substances. It is a valuable and powerful manure, to be used in the same way as the preceding.

Fermented blood from the abattoir, bone chips, bone-meal, fish-manure, leather and hoof trimmings, etc. are all used as concentrated organic manures of great power, and their use is well known to growers of flowers, vegetables and fruits, for the



exhibition table. Bones chipped or broken roughly form excellent material as crocks, for Cacti and Succulents grown in pots; and fermented blood, with or without bone-meal, is a very stimulating manure for strawberries, cucumbers, melons etc. as well as for foliage plants.

The chemical fertilisers mostly used are; *Nitrate of Soda*, which is best distributed in small doses at a time, to be followed by a watering. The action of this nitrogenous fertiliser is very rapid. In the case of flowering plants, if given too early is apt to provoke a luxuriant growth with much development of foliage, and comparatively poor flowers, and therefore if large and fine flowers are desired it is better to give it sparingly at first, increasing the dose as soon as the flower-buds begin to form. Stiff soils are liable to become more stiff and caked by a too frequent use of this fertiliser.

*Sulphate of Ammonia*; requires to be acted upon by the nitrifying bacteria of the soil, and its nitrogen transformed into nitrates, before it can be utilised by the plant. It is therefore best distributed at an early stage, some time before sowing, and must be always applied in crystals or rough powder. It is the chief ingredient in "weed-killers", and therefore if applied in a rather strong solution it is apt to burn the foliage and may kill the plants.

*Superphosphates, Thomas's Slag, Powdered Apatite or Phosphatic rock*. These are the chief phosphatic fertilisers of varying strength and activity. The superphosphates are more soluble and act more readily, the action of others being slower and more prolonged. Phosphorus is very necessary for the life of the plant, and especially for the development of the fruit and of the seed. The phosphatic fertilisers have another important rôle, namely, to liberate the potassium salts, give them a soluble form, and make them available for the roots. They impart a vigorous habit of growth, and are not liable to cause much injury to the plant, even if applied in excess. Bone-meal, fish-manure, guano etc. are organic equivalents of phosphatic fertilisers, and have also the additional advantage of a high percentage of nitrogenous substances, but are comparatively much more costly.

*Potash-salts*; Clayey soils usually contain sufficient potash for the use of the plants, but there is often a deficiency in

sandy and loose soils, from which the soluble potash salts have been gradually washed off by rain. The best known potash salts are the chlorides and carbonates. Kainit and sylvinite are chlorides of potash obtained from the rich deposits of Germany and Alsace. Potash salts are also obtained as by-products of certain industries. The potash salts are particularly useful in the cultivation of all root-crops such as potatoes and other tubers, beets, carrots, radish etc., which make a heavy call on the potash resources of the soil. Potash salts in excess often provoke a more or less stunted growth of the stem and leaves, which is corrected by small doses of nitrogenous fertilisers. It should be noted also, that the chlorine contained in kainit and sylvinite (chlorides of potash), by too frequent and liberal applications, may accumulate in the soil to a dangerous extent. Wood-ashes, ashes from leaves, straw etc, contain much potash, mostly in the form of carbonate, and are therefore a valuable potash fertiliser. Wood-ashes if applied to growing plants should be allowed to be acted upon by the air for some time before use, in order that all the free or caustic potash contained in the fresh ashes, may be transformed into carbonate, by combining with the atmospheric carbonic acid. Wood-ashes are given to palms and most foliage plants in pots, in spoonful doses, twice to four times during spring and summer, to induce healthy growth. They are also valuable adjuncts to fruiting grape-vines, to most fruit trees, and to the kitchen garden.

Under this heading a brief reference may be made to the various vegetable moulds or leaf-moulds used by our gardeners. Many plants must be planted in leaf-mould in order to thrive well; some will refuse to grow at all and will soon perish unless so planted; many others are greatly benefited by sowing in leaf-mould or growing in leaf-mould during their early period, until strong enough to bear ordinary garden soil. The principal advantage of applying a liberal supply of old rotted manure to the seed-bed before sowing, is precisely to furnish the mould necessary for the seedlings in their early stages.

In our case, the main object of cultivating plants exclusively in leaf-mould is too often to provide them with a porous soil free from lime, rather than for the mould itself, although of course the nature of the mould has an important bearing on the success or otherwise of the plants grown in it.

The best leaf-mould is *heather-mould* (*terre de bruyère, terra di erica*), which is occasionally imported from France. Some heather-mould is collected from such places as Wardia etc. in Malta, but it is always more or less mixed with limestone dust and debris, so that it is far from being so satisfactory as the mould collected from the mountainous regions of granitic or siliceous formations.

The next in quality are *Oak-leaf mould* and *Chestnut-leaf mould*. The first is obtained from the forests of common oak (*Quercus Robur*) in England, France, Italy etc., and the second is imported mostly from the Calabrian and Sicilian forests of Chestnuts growing in granitic or schistous hills. It is also obtained in quantities from Corsica, Sardegna and Spain. Chestnut-leaf mould is that commonly in use here, being obtainable easily and cheaply from Sicily. When fresh, it is of excellent quality, but sooner or later it becomes embued with lime and therefore as objectionable as the mould usually prepared by our gardeners. *Calceolarias*, the more delicate Ferns, many *Selaginellas*, *Azaleas*, *Rhododendrons*, *Camellias*, *Gardenia florida*, *Caladiums*, *Crotons*, *Dieffenbachias*, *Alocasia*, *Anthurium*, *Marantha* etc. should be grown in fresh Chestnut-leaf mould, to grow properly. Chestnut-leaf mould which has been used once for these plants may be used for species of *Begonia*, Ferns, *Peperomia*, *Gloxinia* etc., and also afford an excellent compost for seed-pans.

Most moulds are liable to breed earthworms, which are very disturbing and dangerous to the roots of plants and to seedlings. For this reason it is advisable not to use again the mould shaken off from other pot-plants in the process of shifting or changing the soil before it is thoroughly sterilised. This can be done by packing the old mould in a metal box or drum, and subjecting it to the heat of a slow oven for about half an hour at the temperature of boiling water (100°C.), or for a longer period at a temperature of not less than 60°C.

With the object to prevent the development of earthworms, and also in order to have a heavier but porous soil, it is often useful to mix with the leaf-mould one-third to one-half of its volume of silver sand, that is fine siliceous sand, which is more or less angular, with cutting edges like powdered glass. This is eaten along with the mould by the

earthworms, and soon destroys their intestine and kills them. Instead of silver sand, which is very heavy and can be imported from the valleys to the south-east of Naples or from the neighbourhood of Messina, our gardeners very often make use of the so-called *terra di bosco*, a mixture of siliceous sand, ferric pyrites, mica dust, and old mould, collected from the ravines and hills of the province of Messina. This *terra di bosco* should be used mixed with chestnut-leaf mould in the proportion of 1 part to 1 or 2 parts of mould, according to the degree of lightness which it is proposed to impart to the soil, as required by the plant for which it is meant. Used alone, the *terra di bosco* is too stiff and heavy for the roots of most plants, but it is sometimes used also in making composts for certain pot-plants, *Cactaceae*, *Balsamina*, *Palms*, *Aspidistra* etc. by mixing it with garden soil in about equal proportions. It is indeed remarkable that many variegated plants will preserve the beauty of their variegated foliage much better in such composts of silver sand or *terra di bosco*, than in pure leaf-mould or in common garden soil.

Local leaf-moulds made from Loquat-leaves and Carob-leaves are often used, and if properly prepared and rotted, give fairly good results for such plants as will stand a certain amount of lime in the soil. The saw-dust obtained from local factories of mahogany and walnut furniture is also rotted and used as mould; and the rotted heart-wood of the carob-tree, broken up and powdered, has been long in use as a good substitute of leaf-mould. This rotted heartwood, chipped into larger pieces makes excellent crock-material for greenhouse plants generally, as well as for plants in the open air grown in leaf-mould.

The dry foliage and refuse of the garden is utilised by having it fermented and properly rotted in some out-of-the-way corner or enclosure, and supplies an inferior sort of mould, which though too poor for delicate plants, is very useful for mixing with garden soil for certain bedding plants such as *Cineraria*, *Antirrhinum*, *Pansies* etc. This fermented refuse contains all the nourishing substances of the foliage from which it has originated, and besides imparting great lightness and porosity to the soil, it also enriches it by an ample supply of plant food which is easily assimilated by the growing plants.

IV.  
SOWING.

THE operation of sowing is always a delicate one, and often requires a great deal of attention to be successful. The longevity or vitality of seeds varies considerably according to the species. Certain seeds, such as those of the Loquat, the Oaks, Sapindus etc. lose their germinating power in a few days on drying; others such as the seeds of *Livistona chinensis* germinate well even before they are perfectly ripe, but lose their germinating power within one year; others such as Parsley, Celery, Cumin, Onion etc., germinate well during one year, but rapidly deteriorate and die off if kept longer; others, such as Melons, Cucumbers, Tomatoes etc. keep in good condition for four years or more. The Common Stock improves in quality and yields a larger number of double flowers if kept for more than one year. The longevity of seeds has no relation to their size. Certain seeds such as those of *Howea* or *Kentia*, *Jubaea* etc. often take a long time to germinate, sometimes germinating one year or eighteen months after sowing. Others, such as the Radish, the Rocket, the Mustard etc. germinate within 48 hours. Most vegetable and flower seeds germinate within eight days; the Onion takes 9 or 10 days, the Cyclamens from 10 to 18 days or more; most Palms take from 1 to 3 months.

As regards the time or season of sowing, the following general rules will be found useful:

1). All spring flowering plants, whether annuals, biennials or herbaceous perennials, are sown in September-October. Cinerarias, Calceolarias, Primulas may be sown even in August, in a cool and properly shaded place, in order to secure earlier plants.

2). Certain biennials and perennials, such as *Lunaria*, *Hollyhocks*, *Cyclamen*, *Campanula*, *Zonal Pelargoniums*, *Digitalis*, *Streptocarpus*, may be sown also in February-March, and with proper care will flower in the following spring or even in the same year, as in the case of *Streptocarpus*, thus saving about 6 months of trouble with the young seedlings. Stocks are best sown in June-July, in order that the seedlings may be quite strong before planting out in September-October.

3). All summer annuals and perennials, which start active vegetation in March-April, and flower in summer or autumn, are sown in March-April. Such are: Dahlias, Chinese Asters, Zinnias, *Amarantus*, *Gomphrena*, *Tagetes*, *Cosmos*, *Helichrysum*, *Helianthus*, *Chrysanthemum indicum*, *Mimosa lobata*, *Momordica*, *Araucaria*, *Eccremocarpus*, *Cobaea*, *Nicotiana*, *Gloxinia*, *Begonia*, *Mirabilis Jalapa*, ornamental gourds, and such vegetables as tomatoes, egg-plant, basil, chevril, Jerusalem-Artichoke, French-beans, *Asparagus* etc. Many of these summer plants can be sown more or less throughout the summer, for a supply of succeeding crops of flowers or vegetables, but in that case it is better to make use of seeds from the preceding year or years. Lettuce, as also spinach, Carrots, Radish, Celery and a few other vegetables can be sown all the year, but during the hottest months the seed will germinate with difficulty, unless it is previously well moistened with water and kept in a dark place for about 24 hours. Onions can be sown in March-April to obtain a supply of small onions for pickling, or of sets for planting out next autumn, which having a good start will produce enormous bulbs in the following May.

The same rules apply in the case of trees. The seeds of most trees can be sown in March-April, or even a little later, if the delay is unavoidable. The Almond, which flowers as early as January, should be sown in November-December, so that germination may follow in January-February. The seed of the Loquat must be sown as soon as it is removed from the fruit, as it will die off if kept for a few days. So also the acorns of Oaks must be sown in autumn or winter to germinate in spring, or else must be stratified, otherwise they will lose their vitality if kept dry to wait the proper time for sowing. In such cases it is usual to stratify the seeds, that is to store them packed with alternate layers of sand or soil somewhat moist, in order to prevent them from drying too much.

The depth at which the seeds should be sown may be said to be in proportion to the diameter of the seed; that is as a rule the seed should be covered with a layer of soil equal in thickness to the greater diameter of the seed. This rule is by no means absolute. In fact, given the necessary favourable conditions of adequate temperature and moisture, and a suitable soil, most seeds will germinate if sown at a much greater depth.



Others will germinate quite at the surface of the soil, with hardly any covering. Most palms will germinate well when sown at a depth of 5 to 10 times the larger diameter of the seed. On the other hand, many seeds if sown at all too deeply will fail to germinate, even in the best conditions of temperature and moisture, and may either die off, or preserve their vitality unimpaired for a long time, until with the ordinary tillage of the soil, they are brought up again to the surface. Even minute seeds, like those of *Antirrhinum*, *Campanula* etc., will germinate at a depth of nearly 2 c.m. in fairly loose soils; but other minute seeds, such as the seed of *Calceolaria hybrida*, *Gloxinia*, *Begonia* etc. must be sown superficially, without any covering. These last belong to a class of seeds which should be sown in leaf-mould, in pans, and their watering must be done not by sprinkling on the surface, but by placing the pan for some time in water, and allowing the water to soak or rise up by capillarity through the drainage hole of the pan. Other small seeds, whether sown in pans or in beds, should be watered lightly once or twice a day by spraying through a very fine rose, and the dewlike drops should fall on the soil without any pressure in order not to disturb the soil or cause the seed to be driven off to one side of the pan or bed, and the spraying should be so done that the water is absorbed by the soil without running or accumulating, that is without flooding.

The pans should be well drained at the bottom, and the shelter of a glass frame is very useful to prevent the havoc which is often caused by heavy showers of rain. The seed-beds, particularly those prepared in September for the early spring-flowering plants, as well as for vegetables, should be laid out so as to be slightly above the level of the surrounding ground, in order that any excess of rain water and moisture may easily drain off as it may provoke an unhealthy condition of the bed, with disastrous results for the young seedlings. The beds should be made easily accessible on all sides to facilitate the weeding and tending of seedlings, and should not be larger than just sufficient to be watered by one watering can. Watering should be done at least once a day, preferably in the afternoon, when the sun has gone off the bed, and the soil has somewhat cooled, but an additional light spraying in the morning will be found very beneficial.

The beds should be prepared a few days before sowing, and should be heavily manured with well-rotted and old manure, watered once or twice at a few days interval, and left alone for about six days in order to allow the seeds of weeds to germinate, so as to get rid of them before sowing. The sowing is best done in the afternoon, so that the seed may have time to moisten properly and to start fermentation as a prelude to germination activity, before it is subjected to the heat of the sun. It is also always advisable to shade off the beds or the pan by some shading of dry twigs or ordinary cane blinds which may be removed by night, and should be removed altogether as soon as the germination has been completed, in order that the seedlings may not become drawn and weakly.

Seedlings of tender flowering plants, such as *Calceolaria*, *Primula*, *Cineraria*, *Gloxinia*, *Begonia*, *Streptocarpus* etc. may be pricked off with a penknife as soon as they are strong enough to handle, and potted off singly in small pots, which should be lightly sprinkled with water twice a day and placed in a shaded glass frame or other shelter to harden off for a few days. Other seedlings may be allowed to remain in the bed until strong enough to be planted in pots or in the flower-bed. The seedlings if allowed to remain too long in the seed-bed will become drawn up or weakly, or their growth may become too advanced to permit their being planted out with success; besides, the surplus time passed in the seed bed is so much time lost from the period normally required by the plants to reach full development before flowering.

Here brief reference may be made to the use of garden-frames which are an indispensable adjunct to the kitchen-garden as well as to the flower-garden. The frames are usually made of pitch-pine, 1½ metres long by 1 metre broad, raised about 35 c.m. in front, and about 60 c.m. at the back, with a cover of panes of glass, which may be made hinged or altogether removable. However, frames can be constructed of any practical size to suit the various requirements of the grower. Permanent frames, with the sides made of stone or other permanent material are sometimes made, the cover of course being always easily moveable, with its frame made of wood or iron. Sometimes frames are made large enough to require two men to move off the cover, but these of course are not recommendable where

there is only one gardener. The site selected for the garden-frames must vary with the requirements of the grower. If he wishes to raise early seedlings of tomatoes, capsicums, gourds, aubergines, cucumbers or other vegetables, or if his object is to raise early seedlings of Dahlias, China Asters, Begonias etc. the frames should be placed in a sheltered and sunny situation fully exposed to the sun, with the glass panes hardly shaded or not at all. If his object is the early propagation of cuttings etc. of summer flowering or foliage plants, the same situation is advisable, but the glass panes must be well shaded. For all other purposes it is better to place the frames in a warm and sheltered locality, but protected from the direct rays of the sun by trees, or a trellis, or awning, and the panes should be be also more or less shaded. The frames should be made almost air-tight by raising up the earth all round the sides, the necessary ventilation being given when required by slightly raising the cover. For seedlings raised in the cold season, the soil covered by the frame may be removed to a depth of at least 20 c.m., and the pit thus formed filled up with coarse manure which is firmly pressed down and covered with about 2 c.m. of soil, so as to constitute a true hot bed, upon which the seed-pans or rooting pots are placed; and in all cases the soil as well as the pans or pots are frequently sprayed or watered to keep up the required degree of humidity.

## ANNUALS AND BIENNIALS.

UNDER this heading are included the ordinary garden annuals, biennials and herbaceous perennials. The sowing season is stated in the rules already given, and watering is of course regulated by the period of active growth and of flowering. Annuals which flower in spring, being planted out in October—December, usually require to be watered only in the dry periods which may intervene between one shower and another, the ordinary rainfall being sufficient for them, and of course require more frequent attention as regards watering during the dry periods of spring when they are in flower or about to flower, in order to improve the beauty of the flowers, to prolong their life, and to ensure a better supply of good seed. Summer and autumn flowering annuals, which are sown in March-April and flower in May-October, and therefore their cycle of life coincides with our summer period of drought and heat, have to be watered regularly throughout their life, from the moment that they are sown, until they have matured the seeds. In the case of herbaceous perennials their treatment varies in the same manner according to their vegetative period and their flowering period. Those which vegetate in winter and flower in spring, but lose the foliage in summer, such as the *Acanthus*, the terrestrial *Orchids* etc., need very little attention as regards watering during the summer months. Other which, like the *Violet*, the *Pentstemon* etc., flower in spring, but have a period of active growth after flowering and continue in leaf throughout the summer and autumn, must be watered sufficiently to keep up their growth, at regular intervals throughout the dry season. Others, which flower in summer or autumn, such as *Heuchera sanguinea*, *Russellia juncea*, *Campanula fragilis*, *Sedum maximum*, *Helenium autumnale*, *Agapanthus umbellatus*, *Hemerocallis fulva*, *Rudbeckia laciniata*, the *Dahlias* etc., must be watered regularly throughout the whole summer and until they have ceased flowering.

Certain spring and late spring annuals, such as *Antirrhinum*, *Gaillardia*, *Cineraria*, *Primula chinensis* etc., are really perennials, but are best treated as annuals, not only because



they produce finer flowers in the first year, and later on acquire a straggling or irregular habit of growth, but also because most of them, even with all due attention, do not survive the summer. Stocks may be classed along with them, but certain types such as the green-leaved sorts will do well for two years at least, if planted in a dry border, and kept comparatively dry throughout the summer.

Such herbaceous perennials, like *Leontopodium alpinum* (the pretty Edelweis), *Primula auricula* and other gems of the Alpine Flora, cannot be expected to do well here, for reasons of climate. They can be kept for some time in a more or less precarious condition, by growing in pots with vegetable-mould along a northern wall and frequently sprayed to keep up a cool atmosphere around them. Others, like the charming *Salvia patens*, *Gentiana acaulis*, *G. purpurea* etc., besides requiring a colder climate, dislike a calcareous soil, and therefore their cultivation is doubly difficult.

Most herbaceous perennials do better in the half-shade created by the presence of tall trees, or along a wall with a northern aspect; but there are also those which require a sunny and open situation in order to grow and flower at their best. The more commonly grown of these last, are: *Russellia juncea*, *Helichrysum orientale*, *Salvia splendens*, *S. azurea*, *S. erio-calyx*, *S. argentea*, Hollyhocks, Stocks, *Gerbera Jamesoni* and its hybrids, Carnations, Sweet William, Pinks, *Potentillas*, *Lychnis chalcedonica*, *Geum urbanum*, *Alyssum saxatile*, *A. Benthami*, *Anemone*, *Ranunculus*, *Dahlias*, *Agapanthus unbel-latus* and most bulbs.

Many spring annuals thrive well in the shade of trees, and indeed some of them, like *Cineraria*, *Nemophila*, *Saponaria*, *Calceolaria pinnata*, Pansies etc., must be grown in rather shaded localities to develop the beauty of their flowers to the fullest extent. Others require more sunshine, such as *Agrostema*, Chinese Pinks, *Salpiglossis*, *Omphalodes*, *Linum*, *Scabiosa*, *Antirrhinum*, *Linaria*, *Silene*, *Leptosyne*, *Chrysanthemum carinatum*, the Poppies, the Grasses etc. This rule is reversed in the case of most summer and autumn annuals, which without exception must be planted in full sunshine in order to give satisfactory results. Even such species as *Amarantus tricolor*, *A. salicifolius*, *Tagetes erecta*, *T. patula* and others,

which thrive fairly well in the shade, give better results when planted in full sunshine. Indeed, spraying which is so beneficial to most plants if properly done, is apt to bring on a severe attack of mildew on such plants as the Zinnias, the *Celosias*, the Sunflowers, *Helichrysum bracteatum* etc., but surface dressings of old manure repeated once or twice throughout the summer are as useful for summer annuals as they are for spring annuals, and indeed such dressings are frequently a necessity owing to the rapid decomposition of manures under the influence of frequent watering in soils heavily charged with lime.

In planting beds of annuals it is very desirable that the seedlings be of the same strength and age, in order to have evenness of growth and simultaneous blooming periods. Therefore any failures should be attended to and replaced at once, otherwise the desired uniformity of growth cannot be attained; and it is necessary that the seedlings be transplanted with all due care, so as to disturb their roots as little as possible. If the same bed is meant to show only one colour, it is necessary to plant just a little more thickly in order that any plants showing a different colour may be pulled out at once, without leaving appreciable gaps.

Many plants with a tall branching habit of growth, such as *Chrysanthemum coronarium*, *C. carinatum*, *Zinnia elegans*, *Helichrysum bracteatum*, *Tagetes erecta* and a few others, should be trimmed back to about 30 cm. above ground, as soon as they are established in their beds, in order to induce them to throw out side branches and acquire a bushy habit, which will impart greater regularity to the bed and prevent the plants from becoming top-heavy at about the flowering period, when of course it will be much too late to think of trimming them.

Certain summer plants, such as *Zinnia*, *Dahlia*, the double-flowered *Helianthus*, *Tagetes* etc., having a prolonged flowering period, may be trimmed here and there, with all due care, in order to remove straggling branches, withered flowers etc., but this trimming must be done at a sufficiently early period to allow time for the plants to make new growth, and should never be so severe as to deform the plant or to check too much the course of its development.

VI.  
SHRUBS.

SHRUBS, like other plants, from the gardener's point of view may be grouped into various classes; viz: Evergreen and leaf-shedding shrubs, shrubby or woody climbers, and each group may be subdivided into flowering or foliage plants. Climbers, and also the Rose, will be considered under separate headings, and shrubs requiring a soil of leaf-mould such as the Camellia, the Gardenia etc. will be likewise dealt with separately. Even thus restricted, shrubs, both flowering and foliage, offer to the gardener a very wide field for selection to suit all requirements. Indeed no garden can do at all without shrubs, many of which are of easy culture and of high ornamental value. Certain shrubs may in time reach the size of a fairly large tree, but they never lose their inherent shrubby character, by branching at the base or continually throwing up suckers around the main stem. Thus *Laurus nobilis* (the Bay-tree) and *Nerium Oleander* (the Rose-bay), are often reared as standards for planting along avenues, and with persistent treatment can be made to assume a tree-like habit and a height of 8 metres or more, but if neglected for some time, will throw up a large number of side-branches and suckers from the base, and lose their tree-like aspect.

The Bay-tree or Noble Laurel is justly prized for its highly ornamental qualities, and may be taken as a type of a foliage shrub. It is propagated chiefly by seed, and sometimes by rooted suckers. Other evergreen foliage shrubs of the same type are the following: *Myoporum serratum* or *M. insulare*, *M. pictum*, *M. Sandwichense*, *M. angustifolium* usually propagated by seeds or cuttings, *Pittosporum undulatum*, *P. Tobira* and *P. crassifolium*, which are also valuable as flowering shrubs, and are propagated principally by seed, *Coprosma lucida* propagated by cuttings, *Euonymus japonicus*, *Ligustrum europaeum*, *L. lucidum*, *Sciadophyllum digitatum*, *S. pulchrum*, *Cassine Mauricenia*, *Crataegus Pyracantha*, *Corynocarpus levigata*, *Melaleuca diosmaefolia*, *Phyllirea angustifolia*, *Ph. latifolia*, *Cocculus laurifolius*, etc. which are propagated by cuttings; *Ligustrum nepalense*, *Rhamnus Alaternus*, *Caesalpinia*

*Sappan*, *C. Bondicella*, *Eugenia uniflora* or *E. Micheli*, *E. Ugni*, *Psidium Cattleianum*, *Raphiolepis ovata* etc. which are propagated by seeds; *Duranta Plumieri*, *Parkinsonia aculeata* etc. which are also highly ornamental on account of their flowers.

The Rose-bay or Oleander is also highly prized for its ornamental qualities. Here it supplies, and not unworthily, the place of the Rhododendrons in more northern latitudes. It is in flower practically all the summer, and for elegance of bearing as well as for the vivid or delicate colours of its flowers it is hard to beat. It has only one drawback, the leaves being somewhat rough and viscid, are apt to retain much road dust. The tree in all its parts is also very poisonous, and the flowers should not be made use of for decorating closed rooms. It is propagated by cuttings, layers, or suckers, rarely by seed. Thrives in all soils, and does not object to stagnant moisture; in moist soils and sheltered situations it often reaches the size of a fine tree up to 7 or 8 metres high. *Nerium odorum*, or *N. flavescens*, the Yellow Oleander is a smaller shrub very pretty and ornamental. *Hibiscus rosa-sinensis* and its various forms, single or double, are very recommendable for the more sheltered gardens. They are very ornamental and showy throughout the summer and autumn, and are chiefly grown from cuttings and layers, but *H. schizopetalus* is usually multiplied by grafting on *H. rosa-sinensis*. The pretty *Bauhinia purpurea* is almost an evergreen, losing its foliage in spring, at the same time that it is covering itself with its Cattleya-like flowers, and is propagated by seed. *Photinia serrulata* or *Crataegus glabra*, and *Raphiolepis indica* have shining green foliage and panicles of white or pinkish flowers; they are best propagated by grafting on quince stock in winter. *Albizia Julibrissin* with its large heads of fine caper-like flowers is very ornamental, and like the Mimosas and Acacias is propagated by seed. Among the Acacias the following are the best known in our gardens: *Acacia Farnesiana* (the Sponge-tree Acacia), *A. longifolia*, *A. cyanophylla*, *A. semperflorens*, *A. suaveolens*, *A. saligna*, *A. moluccana*, *A. linifolia*, *A. Baileyana*, *A. cultriformis* etc. *Abutilon Thompsoni* and other sorts usually grown from cuttings, are valuable both as foliage plants and for their bell-shaped flowers. *Abutilon vexillarius* has larger leaves and smaller dark-red flowers produced in bunches. *Cassia*

floribunda, *C. corymbosa* and other species, are met with here and there and are always grown from seed. *Jochroma tubulosum* or *Cestrum cyaneum*, *Jochroma coccineum* or *Cestrum coccineum*, *Cestrum fastigiatum*, *C. nocturnum*, *C. aurantiacum*, *C. porphyreum* or *Habrothamnus elegans*, and other shrubs of the Solanaceous family are always ornamental and rich-flowering. They are mostly grown from cuttings, but *Jochroma coccineum* is better grown from seed. *Datura arborea*, *D. sanguinea* and *Brugmansia candida*, especially this last which is much admired in the public gardens and is often confused with the less recommendable *Datura arborea*, are propagated by cuttings. *Caesalpinia* (*Poinciana*) *Gillesii*, the Paradise flower, propagated by seed, is another useful flowering shrub, practically evergreen, and *Akania Malvaviscus* or *Malvaviscus arboreus* with its dark green foliage and scarlet flowers is always attractive. *Acocanthera spectabilis* is a pretty evergreen shrub with glossy foliage and bunches of sweet-scented jasmine-like flowers, produced in the axils of the leaves, and does well in dry sunny situations. The well-known *Wigandia caracasana* and its congener *W. urens*, propagated by seed or suckers, with their ample foliage give a tropical aspect to the shrubbery. *Tecoma capensis* with dark shining green foliage and bunches of lively scarlet flowers produced profusely in summer and autumn, is in reality a climber but is often trained as bush or standard. It is propagated easily by layers; so also *Tecoma stans* with its golden yellow flowers and *Tecoma Smithii* with large terminal heads of deep golden flowers are now much grown. They are easily propagated by seed or layers and do well anywhere, provided that they are well sheltered to develop their great wealth of flowers in autumn. *Sparmannia africana* and its double-flowered variety are in flower practically all the year and are easily grown from cuttings or suckers, thriving well in dry situations.

Certain evergreen flowering shrubs would be much more cultivated and appreciated if they were better known. Two examples may be quoted here. *Rondeletia speciosa* or *R. odorata*, a Rubiaceous plant, with its pretty small oval coriaceous dark green leaves is covered all over throughout the summer with very ornamental orange-coloured flowers. It is an old acquaintance in our gardens, and is perfectly hardy. It is easily

propagated by layers, but for some unaccountable reason it is little grown, although its cultivation presents no difficulties. So also, *Templetonia retusa*, a Leguminose shrub, with its elegant tiny linear emarginate leaves of a dark glaucous green, produces a profusion of large dark-red pea-like flowers in spring. It is propagated by seed, and its growth is rather slow, but it resists the drought admirably and adapts itself to any soil. *Viburnum Tinus* is a winter-flowering shrub usually propagated by seeds or cuttings, and is deservedly popular.

The number of leaf-shedding flowering shrubs which grow well in these Islands is as large as that of the evergreen shrubs, and includes quite a number of very desirable species, provided that there is room enough for them in the garden. The well-known Frangipani (*Plumeria alba* and its congeners *P. acutifolia*, *P. bicolor*, *P. rubra*, etc.) have been long grown in our gardens, and sometimes reach the size of small trees. The first named is preferable to the others, producing larger heads and larger flowers, which as in all species have a delicate perfume. It is easily propagated by cuttings taken towards the end of May or early in June, just when the new leaves are forming. The cuttings should be dried in the shade for 2 or 3 days before planting, and should be sparingly watered until they are well rooted and are making fine growth. Water should be withheld in winter. The double-flowered pomegranate with its dark green foliage and double scarlet flowers striped white is very showy, and requires very little attention. The ubiquitous *Eleagnus angustifolia*, popularly known as *Oliva speciosa*, is appreciated on account of its agreeably though strongly perfumed flowers produced in spring. The mock-Orange (*Philadelphus coronarius*) in its many varieties, and the graceful *Spiraea prunifolia* and its double-flowered form, which flower profusely in spring are universally appreciated and thrive well in a deep soil moderately moist. *Hibiscus mutabilis* with its large double white flowers produced in autumn, turning red within 24 hours, and the many single and double-flowered varieties of *Hibiscus Altea* are also popular. All these and other leaf-shedding shrubs are propagated by cuttings or suckers, during winter. The pretty and very popular White Broom (*Genista alba*) and the yellow-flowered Spanish broom (*Spartium junceum*) thrive well in dry soils and are propagated by seed.



*Erythrina Crista-galli* is a very showy shrub in May-June, with its large velvety-red pea-like flowers. It is propagated by seed, and thrives well in a large pot. It should be planted in a dry, sheltered situation, where with due care it may reach a height of 4 or 5 metres, but is apt to lose many of its branches in winter, being often reduced to a mere stump. The beautiful Lilacs do well in a deep soil and a cool situation. They should be more popular with our gardeners. They are best propagated by grafting on seedlings or suckers of the wild or typical Lilac. *Euphorbia* or *Poinsettia pulcherrima* is a gorgeous autumn-flowering shrub much cultivated, and is propagated by ripened cuttings during winter or early spring. Another old denizen of our gardens is the sweet *Verbena* (*Lippia citriodora*), which is commonly met with in country-yards and gardens. It is propagated by cuttings in winter, and its highly aromatic leaves and flowers are the principal ingredient of the *pot-pourri*. There are of course many other shrubs, both evergreen and leaf-shedding; which for the sake of brevity are being left out from this enumeration. It may be pointed out, however, that the distinction between shrubs and bushes is not always clear, the term bush being generally applied to the smaller shrubs with or without stems or suckers arising from the base. Such plants as *Melianthus major*, *M. minor*, *Clerodendron fragrans*, *Echium fastuosum*, *Psiadia glutinosa*, *Rubus* sp., *Justicia carnea*, *J. coccinea*, *Aphelandra* sp. *Solanum Dom-beyanum*, *Murraya exotica*, *Strobilanthus Dyerianus*, *Veronica Hendersonii*, *Viburnum Opulus*, *Diosma ericoides*, *Hypericum aureum*, *Calliandra pulcherrima*, *Buxus sempervirens*, *B. balearica*, *Rosmarinus officinalis* etc. are rather bushes than shrubs, but for all that their ornamental value cannot be questioned.

The use of Shrubs and Bushes in the garden is not often rightly understood. In small gardens, shrubs like *Plumeria*, *Duranta*, *Hibiscus* etc. are made use of instead of trees, and such use is of course commendable. They can be also planted as isolated specimens in large flower-beds, where they improve the general appearance of the bed, and serve to break up the monotony of colour and the uniformity of the bed, which would otherwise be too strikingly artificial. However, shrubs are too often huddled together between large trees, where they have a hard struggle for existence, become deformed and

lose much of their beauty and ornamental character. Shrubs, especially the larger species, should be planted by themselves, properly spaced, so that they may attain their proper development, trimming them just enough to keep them in shape, and to remove dead or sickly branches. It is important to select the site for each species according to its requirements, as regards shelter, the quality and depth of soil, and local conditions of moisture. Bushes may be planted in front of shrubs, and many of them will do well in the shade of trees or even of tall shrubs, thus making good use of the space beneath the trees which otherwise would often remain bare. Certain bushes will stand the drought as well as the trees themselves, and their presence is rarely prejudicial to the continued well being of the trees.

In many cases, if the place is sufficiently moist, or if there are arrangements for periodical irrigation, the whole space between the trees can be covered with bushes and herbaceous perennials, and such an association of trees, bushes and perennials is particularly advisable along the boundaries of the garden, in order to hide unsightly walls and provide a quiet walk away from the flower-beds, without an excessive display of colour.

Shrubs and bushes requiring frequent watering should not be planted close to trees which are not frequently watered. They will do well, of course, for the first season, but too soon the roots of the trees will crowd around them in such a manner that the further growth of the shrubs and bushes becomes impossible. Dressings of manure for shrubs and bushes are best given in autumn; but where there is periodical watering in summer, manure may be applied again in spring, and indeed a dressing of old manure, given early in spring immediately before commencing irrigation will greatly improve the activity of the roots.

# VII. CLIMBERS.

THE annual climbers are many, and are often very ornamental or interesting. The Sweet Pea is of course an annual climber, and on account of its popularity, the beautiful shades of colour and the various strains would deserve to be dealt with under a separate heading, if more space were available. The Sweet-Pea is a native of Sicily and the East, the original species *Lathyrus odoratus* being found wild in those sunny lands. In our gardens the wild species has given place to numberless varieties, which are now more or less grouped in strains. The large-flowered strain bears very large flowers, mostly four on the same truss, and the shades of the colour are perfectly lovely. The standard or large upper petal is usually of good substance and more or less waved. The early-flowering or Christmas Sweet-peas are much smaller, and the range of colour is less extensive, but as they are sown in August to flower in December, January and February, they are justly appreciated for supplying a graceful and deliciously scented flower when other flowers are scarce. The Sweet-pea must have a good red soil, deeply worked and well-manured. The spring-flowering strains are sown in October-November, and are best sown at first in small pots, 4 to 6 seeds in each pot, and are transferred to the open ground towards the close of November or early in December, in a sunny and sheltered situation which has been properly tilled and heavily manured about one month before. The seedlings soon begin to make headway, and in February the stems will have to be trailed on sticks or other support prepared for them. They must not be allowed to suffer from want of water, and are benefited by a watering with liquid manure in February or early in March. The soil should be very well drained naturally, as any excess of moisture is sure to induce a sickly condition from which the plants will not recover in time to flower well.

Most annual climbers flower in summer and autumn, and prefer to be sown directly in place, on a soil deeply digged and manured some days before sowing. Indeed, there are few annual climbers which can be sown in a bed and then trans-

planted with a ball of earth, without seriously checking their growth. Among these may be mentioned the various species and varieties of ornamental gourds belonging to the genera *Cucurbita*, *Cucumis*, *Coccinea*, *Lagenaria*, *Luffa*, and *Benincasa*, as well as the nearly allied *Momordica Charantia*, *Momordica Balsamina* and *Bryonopsis laciniosa*; the pretty *Thunbergia alata*, the interesting Bladder-vine *Cardiospermum Halicacabum*; the very elegant Cypress-vine *Ipomoea Quamoclit*, and its congener *Ipomoea coccinea* with their scarlet Jasmine like flowers produced throughout the summer. These last climbers are of course chiefly pot-plants with limited development. But other species of annual *Ipomoeas* are better sown directly in place, and with proper treatment will develop enormously during the summer, flowering in profusion until killed by the cold of the last days of autumn. Among the *Ipomoeas* the first place belongs to *I. rubro-coerulea*, a species from Soudan introduced here in 1912. Its growth is quick and extensive, climbing up to a height of 5 metres or more; and the flowering period commences in September, producing every morning a considerable number of large blooms, of a charming sky blue colour with a yellowish throat. Other species such as *I. Convolv*, *I. limbata* etc., are also grown. The seed may be sown in clumps of 5, and the seedlings thinned out to 1 or 2, reserving the most vigorous.

*Mina lobata* and *Eccremocarpus scaber* are two summer climbers often grown to cover bowers and pergolas. They flower in autumn, usually very profusely but rather late, so that the blooming is not very prolonged. They require the same treatment as *Ipomoea*. The pretty *Bryonopsis laciniosa erythrocarpa* is ornamental both on account of its elegant vine-like foliage as well as for the clusters of small round scarlet fruits with longitudinally arranged silvery white blotches, which remain long after the plant has died off late in autumn. This creeper is used to cover the stems of trees, and for cultivation in pots, and has practically naturalised itself in several gardens. *Clitoria Ternatea* is another pretty creeper of limited growth suitable for pot culture, producing large sky-blue flowers, more or less resembling a huge Sweet-pea; there is also a pure white variety which is not so charming as the typical form.

*Humulus japonicus*, with very ornamental foliage variegated white, is grown to cover pillars and stems of trees. *Canavalia*



*gladiata*, the Sword-bean, is grown for the interesting huge pods containing 4 to 10 large oval red beans with a long white hilum. The beans are sown singly, and the plant has a limited development, but may produce as many as twenty pods. The Scarlet Runner-bean (*Phaseolus hispanicus*) is likewise cultivated as a curiosity, for its small racemes of scarlet flowers followed by pods with 2 to 5 violet kidney-shaped beans mottled white. *Maurandia Barclayana* is grown for the sake of its large purple or pink flowers.

All these summer annual climbers require more or less the same treatment, viz: a good soil well manured, frequent watering and a sunny situation.

The perennial climbers, as in the case of shrubs, include both evergreen and leaf-shedding species, and each group includes both flowering and foliage plants. The true *climbers* are those which are naturally provided with *some means* to climb, either in the shape of tendrils as in *Tecoma capreolata*, and *Coccinea indica*, or of hooks as in *Tecoma Tweediana*, or of fulera as in *Tecoma radicans* and the Common Ivy, or of curved thorns as in *Bougainvillea*; or the stem may be voluble as in *Ipomoeas*, *Stephanotis*, *Mandevilla*, *Cephalandra*, *Dolichos* etc. Other species, such as *Bosea Yerva-Mora*, *Buddleia americana*, *Solandra grandiflora*, *Jasminum primulinum*, *J. officinale* etc., are simply sarmentose.

The evergreen climbers include such species as *Bougainvillea spectabilis*, *B. glabra*, *B. lateritia*, *Stephanotis floribunda*, *Cryptostegia grandiflora*, *Hoya carnosa*, *Arauja sericifera*, *Jasminum primulinum*, *J. azoricum*, *J. lucidum*, *J. officinale*, *Rhynchospermum jasminoides*, *Tecoma capensis*, *T. rosea*, *T. jasminoides*, *T. Tweediana*, *Bignonia capreolata*, *B. Lindleyana*, *B. lucida*, *Ficus repens*, the common Ivy (*Hedera Helix*) with its numerous varieties, *Dioclea glycinoides*, *Buddleia americana*, *Plumbago capensis*, *Mandevilla suaveolens*, *Lonicera australis*, *L. Hildebrandti*, *L. Caprifolium*, *Lapageria rosea*, *Celastrus angulata*, *C. scandens*, *Aristolochia elegans*, *A. altissima*, *A. ornithocephala*, *A. grandiflora*, *Cephalandra palmata*, *Ephedra altissima*, *Muehlenbeckia complexa*, *M. cymbaefolia*, *Passiflora corulea*, *P. lunata*, *P. quadrangularis*, *P. princeps*, *P. edulis*, *Polygonum Baldschuanicum* etc. The common *Anredera scandens* and *Mikania scandens* are two old denizens of our gardens.

Most of these climbers can be propagated by layers, or by cuttings or by seed. A few, such as *Aristolochia*, *Schubertia*, *Cryptostegia*, *Arauja* or *Physianthus*, are usually only grown from seed; *Ficus repens* and *F. minima*, *Bosea Yerva-Mora*, most *Passifloras* etc., are propagated only by layers or cuttings. *Plumbago*, *Dioclea* etc., are propagated by suckers which are freely produced around the stem. *Calonyction emiclaeum*, the magnificent Moon-flower, is deservedly popular and is very easily propagated by layers.

*Duranta Plumieri*, *Bosea Yerva-Mora*, *Bignonia capreolata*, *Tecoma Tweediana*, *Rhynchospermum jasminoides*, *Stephanotis floribunda*, *Jasminum azoricum*, *Lonicera* and *Aristolochia* are particularly suitable for evergreen bowers or pergolas.

The leaf-shedding climbers, although less numerous, are hardly less ornamental. Some of them, such as *Tecoma radicans*, its varieties *sanguinea* etc., and *Ampelopsis quinquefolia*, reach a great height and are able to attach themselves naturally to the wall, requiring no assistance. *Wistaria sinensis* is another tall growing species, with voluble stems, and *Datura sarmentosa* or *Solandra grandiflora* is sarmentose and usually leafless in winter, and can be carried up to 12 metres or more. *Wistaria* is chiefly propagated by seed, and the others by cuttings or layers. Other leaf-shedding climbers are the following: *Jasminum nudiflorum*, *Tecoma grandiflora*, *T. Kerere*, *Cardiospermum hirsutum* (a fast growing species really evergreen, but usually leafless in winter), *Ampelopsis Veitchii*, *A. Henryana*, *Clematis Vitalba*, *C. Flammula*, *C. montana*, the *Wichuriana* Roses, *Petrea volubilis*, *Akebia quinata* etc. *Sechium edule* and *Abobra viridiflora* two Cucurbitaceous species, are really evergreen, but generally lose the foliage in winter.

*Tecoma grandiflora* is a magnificent species of rather low habit of growth, often more or less shrubby; so also is *Quisqualis indica* a rare species with scarlet Jasmine-like flowers. *Solanum Dulcamara*, *S. jasminoides*, *S. Seaforthianum* are partly evergreen; and *Dioscorea Batatas* and *D. discolor* throw up new stems every year from their underground tubers.

*Antigonon leptopus* is a truly elegant climber producing large panicles of very pretty rose or pink flowers throughout

the summer and autumn. *A. leucanthum*, a species or variety with pure white flowers in smaller panicles, is still rare in our gardens, but it has not the vigour and the charming contrast of colour of *A. leptopus*. Both are grown from seed. The splendid *Solanum Wendlandi*, which is practically leafless in winter, produces large heads of bluish-mauve flowers throughout the summer, and is also an excellent creeper for pergolas. It is propagated by cuttings or layers in March-May. *Passiflora alata* (var. *Constance Elliott*), and the remarkable *Phaseolus Caracalla* (the Snail-flower) are also mostly leafless in winter. This last is propagated by seed; the first both by seeds and suckers.

Apart from the support and space which they require, the climbers should have the same treatment as shrubs and bushes. Such species as *Lapageria rosea* and its variety *alba*, *Asparagus plumosus* and perhaps also *Bignonia Lindleyana*, should be grown in leaf-mould mixed with silver sand. *Piper porphyrophyllum* a most beautiful greenhouse foliage creeper, requires the same soil, may be propagated by cuttings in early summer, and must have the shelter of the glass house throughout the year. The more tender climbers, such as *Stephanotis floribunda*, *Aristolochia gigas* (*grandiflora*), *A. altissima*, *Schubertia grandiflora*, *Mandevillea suaveolens*, *Passiflora quadrangularis*, *P. princeps* etc., require a sheltered situation, a good soil, and proper attention in watering. All the others are more or less hardy and if properly established will require little attention beyond an occasional dressing of manure and periodical watering, and of course periodical trimming and trailing.

The layering of climbers is commonly done in spring, when the vegetative process starts into fresh activity after the rest of winter, and in most cases the formation of roots takes place within one month to six weeks, but the layers should not be severed from the mother-plant before they are sufficiently well rooted to be able to bear an independent existence. Very often the rooting process is facilitated by *ringing* the bark, by *bruising* or *tongue-splitting* of the stem, or even by partly breaking it off, to hasten the formation of a rooting callus. The layers of certain creepers will take a long time to root; others such as *Bougainvillea*, *Jasminum*, *Stephanotis* will not root before June or July. There are also creepers which root in a

short time, and any branch touching the soil will root at once. This is the case with the *Wichuriana* roses, *Jasminum primulinum*, *J. nudiflorum*, many species of *Rubus*, *Ipomoea purpurea*, *Calonyction emicollatum* etc. The branch selected for layering should be preferably, though not necessarily, that formed in the preceding year, but in a few cases such as *Jasminum primulinum*, *J. nudiflorum*, *Rubus* etc. as well as the rich flowering bushy perennial *Russelia juncea*, the tips of growing branches make excellent layers, and root at once if dipped for 1 to 3 c.m. in the soil kept moderately moist. The new vigorous stems of creepers make better layers than the weaker wood, but in all cases it is necessary that the stems be properly wooded or lignified, that is at least 6 months old. Many climbers, particularly the leaf-shedding species, are easily propagated by seasoned cuttings planted in winter or early spring, before the start of active vegetation. Evergreen creepers are also often propagated by cuttings taken during spring or summer, and planted under glass or in a warm and shaded situation, but such cuttings usually take a longer time to grow into fine plants, than it is the case with layers. In some instances, such as *Bosea*, *Solandra*, *Celastrus*, cuttings can be planted practically all the year.

The trimming of creepers is a very important consideration, often requiring much skill on the part of the gardener. In a few cases, such as *Stephanotis floribunda*, *Hoya carnosa*, *Physianthus albens* etc., the trimming should be limited to the removal of dead and sickly branches, and to the extricating and spreading out those branches which have got twisted together during last year's growth. Such trimming should be done at the commencement of the growing period in spring, and again once or twice in the course of summer. The gardener need not be particularly attentive as regards the position of the leaves, as in a short time, sometimes within 24 hours, they will turn round and take up their normal position, with the upper surface facing the light. Fleshy and coriaceous leaves, such as those of *Hoya*, *Stephanotis* etc., of course take a longer time to turn round, but tender leaves such as those *Mikania*, *Dolichos*, *Maurandia*, *Ipomoea* etc. usually turn round in the night, and are found in the morning facing upwards. Ivy-*Geraniums* are best trimmed early in winter. *Jasminum officinale* must be

trimmed or rather pruned somewhat hard in winter, and such climbers as *Clematis Vitalba*, *Tecoma radicans*, *T. grandiflora*, the showy *Lantanas* etc., are treated in the same manner. Other creepers, such as *Bougainvillea*, *Lonicera* and the Rambler *Wichuriana* Roses, must be trimmed rather hard soon after they have done flowering, in order to induce them to form good fresh wood for next year's flowering season. The *Bougainvillea* is entitled to be called the Queen of Climbers, and covers our walls with magnificent tapestries for a prolonged period. To preserve and foster its flowering qualities the trimming should be done as soon as the last flowers have faded in April or May. A second trimming just sufficient to shorten or top the new growths may be done early in September, upon which the flowering shoots begin to develop as side-twigs on the trimmed branches. In the case of the spring and summer-flowering *Bougainvillea glabra* *Sanderiana* the trimming and trailing may be done in June-July, and a second light trimming is done in winter. The common Ivy is best trimmed towards the close of summer, but the rule that climbers should be trimmed after they have done flowering is on the whole a very safe one to follow. The *Wichuriana* or Rambler Roses must be trimmed rather hard after the flowering period, in order to induce them to throw up a number of new shoots or stems in the summer and autumn on which the flower-shoots will develop in the following spring.

The common Ivy, the Cape Plumbago, *Jasminum nudiflorum*, *J. primulinum*, *J. azoricum*, *J. lucidum*, *Passiflora coerulea*, the Virginian Creepers (*Ampelopsis*) and a few others will do well along a northern wall, but most other creepers require a sunny situation, along a wall looking towards the east or south. Some of them, such as *Wistaria*, *Tecoma radicans*, *T. jasminoides*, *Bignonia capensis*, *Buddleia americana*, *Solandra* etc., will tolerate a situation looking to the south-west or west.

The more tender climbers, requiring leaf-mould and usually glass house treatment, such as *Lapageria rosea*, *Manettia bicolor*, *Cissus amazonica*, *C. discolor*, *C. Lindenii*, *Piper prophyrophyllum*, *P. nigrum*, *Asparagus plumosus*, *A. Bonplandii*, *Plumbago zeylanica*, *Clerodendron Balfourii*, *Dioscorea discolor* etc., should be trimmed as little as possible, or nothing at all, and they should be trained on supports made of thick galvanized wire or slender bamboo-canes.

## ORNAMENTAL TREES.

THE cultivation of annual flowering plants, of bushes and of shrubs, is popular enough, and the results obtained, as seen in the Public Gardens and in the Annual Shows, and as it can be seen by a visit to the numerous small gardens and yards attached to country residences is quite satisfactory. However, the cultivation of ornamental trees is still in a very backward condition, and except in a few large private villas, the planting of ornamental trees is hardly ever thought of, or perhaps limited to the occasional planting of a Norfolk Island Pine (*Araucaria excelsa*) in a country-yard or in the centre of a parterre, where it has only a poor chance to grow. Of course there are rather extensive plantations of ornamental trees in the Public Gardens at Verdala Park, Boschetto, San Antonio, the Valletta and Floriana Gardens etc., as well as along the roads and open spaces in Malta and Gozo. The number of ornamental trees in the Government Gardens and along roads has increased very considerably during the last 25 years, but unfortunately our Islands are still practically treeless, and notwithstanding the many groves and orchards existing in both Islands, the generally bare and uninviting aspect of our hills and countryside is greatly to be regretted, for aesthetic as well as for economic reasons.

The planting of ornamental trees along roads and in public spaces would have given more satisfactory results, and would have been pushed on with greater energy and, it may be supposed, with a larger outlay of funds, but for the many drawbacks which militate against the existence of public trees in these Islands. I am not referring to the natural drawbacks, however important they may be, such as the dry climate, the long drought of summer, the abundance of lime in the soil, the rocky nature of the ground, etc. owing to which both the planting and the maintenance of public trees are necessarily difficult and costly undertakings. But anyone who is sufficiently conversant with our circumstances, will agree that the superabundant and ubiquitous goat is directly and indirectly the worst enemy with which our public planters have to contend. Of late



years considerable plantations have been destroyed or irretrievably damaged by goats and their goatmen, who often not satisfied with the injury inflicted by their goats, break off the leafy twigs of young trees to feed their goats. There is moreover a decidedly vandalic spirit in several districts in both Islands, where children, and also grown-up people who should know better, take a certain pleasure to peel off the bark of trees or to maim their branches, and generally speaking, against one offender brought to justice and usually let off with a light sentence, many others remain undetected. It appears that most people are not yet aware that the public trees are public property, and the expense of their planting and maintenance is defrayed by the people themselves.

With a view to foster a more reasonable and sympathetic attitude towards trees in general and public trees in particular, the writer had suggested many years ago the holding of an Annual Arbor Day, in which with as little bureaucratic interference as possible the people, including the children frequenting the Elementary Schools, would take part, under the auspices of the Horticultural Society or of the Agricultural Society, with the assistance of the staff of the Public Gardens. What number of trees should be planted on such occasions is of course immaterial, the object being to impress on the people and especially on the growing generation, the importance which trees must have on the moral and physical welfare of civilised communities.

From the gardener's standpoint, ornamental trees, like shrubs and climbers, may be grouped into two large classes, viz: the evergreen and the deciduous trees, with widely different cultural requirements. Many trees which grow well in neighbouring countries, in approximately the same climatic conditions, cannot thrive here owing to the calcareous soil, and perhaps it is just as useful to speak of our failures as to point out our successes, so that those who wish to try again what others have tried before them, may know beforehand what will be the probable result of their experiment.

With the exception of the Larches and of the so-called Deciduous Cypress (*Taxodium*), which do not grow in these Islands, all Conifers are evergreen, and are mostly very orna-

mental in character. Unhappily most of them do not agree with a calcareous soil, and many others require the cool climate of mountainous regions, and hence their successful cultivation in our gardens is out of the question. The only Conifers which thrive very well with us, are: *Cupressus sempervirens* and its varieties, *horizontalis*, *fastigiata*, *pyramidalis*, *truncata*, etc., *C. Lambertiana*, *C. funebris*, *Pinus halepensis*, *P. Pinea* and its var: *fragilis*, *Callitris articulata*, *Juniperus virginiana*, *Thuja orientalis*, *Th. occidentalis*, *Araucaria excelsa* and its varieties *glauca*, *Cunninghami* etc., *A. Cookii*, *Thuyopsis borealis*, *Cephalotaxus drupacea*, and *Taxus baccata* (the common Yew). A few others succeed occasionally, but mostly die off after a few years of promising existence, when planted in the open ground. These are *Cupressus elegans*, *C. lusitanica*, *Araucaria Bidwilli*, *A. brasiliensis*, *A. imbricata*, *Cedrus Libani*, *C. Deodara*, *C. atlantica*, *Cryptomeria elegans*, *Cephalotaxus Fortunei*, *Juniperus Bermudiana*, *Pinus austriaca*, *P. Strobilus*, *P. sylvestris*, *P. Gerardiana*, *P. canariensis*, *P. longifolia*, *Sequoia gigantea*, *Thuja gigantea*, *Abies cephalonica*, *A. Nordmanniana* etc.

Most Conifers are propagated by seed, but some of them such as *Juniperus virginiana*, *Araucaria excelsa* etc. can be grown from cuttings specially selected with a leader, and woody at the base. The varieties and forms are often propagated by grafting. Conifers, like all evergreens, must be transplanted with a ball of earth, and this operation is best performed in April—June or in September—October.

The Evergreen-Oak (*Quercus Ilex*) grows well in our soil, and thrives best when planted in a situation exposed to the west. This fine tree is a native of this Island, and there are magnificent ancient specimens of this species growing at Ballut (Wardia), at Imgiebah and at Boschetto, those at Wardia being the finest and largest. These are the remnants of the ancient forests of Evergreen Oaks which there is reason to believe formerly existed in several parts of the Island.

*Quercus coccifera* is another beautiful evergreen oak, with smaller foliage of a deeper green. There is a fine specimen of this species (var: *Calliprinos*) about 50 years old, in the Argotti Botanic Gardens, but rarely seeds, the male catkins being produced here in autumn and the female flowers in spring.

*Quercus Suber*, the Cork-Oak, is nearly allied to *Q. Ilex*, but dislikes lime, and cannot be grown here unless it is grafted or budded at ground level on seedlings of *Q. Ilex*. No other evergreen oak has so far given a good account of itself in these Islands.

The Carob (*Ceratonia Siliqua*) is another evergreen which is a native of the Maltese Islands, and thrives well on red soils and broken rocky lands. It may be classed also as a fruit tree, its pods being a valuable nourishing food for certain animals. It is propagated chiefly by seed, but can be grown also from cuttings or layers. As an ornamental tree the Carob has only one drawback. It has a tendency to assume a low spreading habit, and to lower down its branches, so that it is not an ideal tree for avenues. It requires a situation sheltered from strong winds, in order to develop a habit more or less erect, with a tall straight stem.

The genus *Ficus* includes several species which do well here, and develop into trees of large size, with very ornamental foliage. The following tree-like species are in cultivation, viz: *Ficus elastica* and its varieties *macrophylla* and *variegata*, *F. magnoliaefolia*, *F. dealbata*, *F. Benjamina*, *F. retusa* or *F. citrifolia*, *F. rubiginosa*, *F. Sycomorus*, *F. altissima* and *F. reticulata*. They are propagated more or less easily by cuttings or layers, but although they fruit abundantly, seed is never produced probably owing to the absence of pronubal insects. The species of *Ficus* have a powerful root-system and are mainly surface feeders. They can be trimmed or clipped to shape without much injury, and are fine avenue trees, usually producing numerous adventitious roots from the stems and branches, which descend to the ground, and growing quickly assist in fixing the tree more solidly and enable it to bear well the enormous weight of the foliage.

The tall-growing Silk-tree of Australia (*Grevillea robusta*) is a very good subject for planting out in sheltered situations, with a deep soil moderately moist. It is very attractive on account of its finely cut silvery foliage, and of its beautiful brush-like bunches of reddish flowers produced in spring and early summer. *Schinus Molle* (the False Pepper) and its congener *S. terebinthifolia* are two trees commonly cultivated for avenues. They are specially suitable for dry soils, in rather sheltered

situations, and are propagated by seed. They are balsamic trees, recommendable for the purifying influence of their exhalations on the atmosphere around buildings.

*Citharaeoxylon quadrangulare* (the Fiddle-wood tree of N. America) loses its foliage for about two months in April—May, but may be considered as an evergreen. It is propagated by cuttings in spring. It forms large round dense heads of shining green foliage, and catkins of small sweet-scented white flowers throughout the summer.

The genus *Eucalyptus* is rather difficult to deal with, owing to the calcareous and dry nature of our soil, but a few species such as: *Eucalyptus leucoxylon*, *E. occidentalis*, *E. corynocalyx*, *E. macrorhyncha*, *F. calophylla*, *E. viminalis* and *E. maculata* do fairly well here, if planted in deep soil and rather close together. They are propagated by seed. *E. obliqua*, *E. sideroxylon*, *E. marginata*, *E. globulus* are other species which occasionally do fairly well, but cannot be relied upon.

The Olive-tree, whether the wild form or the cultivated varieties, do very well in our soil and climate. It is not particular as regards situation, but does not stand the sea-breeze, and is best grown in a deep soil, moderately moist. It is propagated by seed, by budding on seedlings, by cuttings or by truncheons or knobs, and by suckers, with or without roots, taken from the base of the trunk in winter or early spring. When transplanted, young trees should be severely pruned back, and the transplanting is best done in the winter months with or without a ball of earth. The foliage of the Olive-tree lacks the attractive shining green colour of other trees, but has an elegant and picturesque aspect.

*Sapindus indica* is another fine ornamental tree, with a large dense head of dark shining foliage. It is propagated by seed and requires a deep moist soil and a sheltered situation.

*Lagunaria Patersonii* grows to a large size, and produces an abundance of purplish or lilac flowers in spring and early summer. The tall pyramidal variety should be preferred, and comes true from seed. A deep soil and a sheltered situation are necessary for the proper development of this tree. Its foliage is of a dull whitish green, and the capsules contain short bristle-like hairs which may be carried away by the wind and are irritating to the skin.



*Rhus viminalis* is a low tree with very elegant drooping foliage, and produces panicles of very small greenish flowers in spring. It is quite ornamental, but has a straggling habit, its branches becoming contorted and out of shape. It is propagated by cuttings in winter.

The species of *Casuarina* are very remarkable on account of their greenish leafless twigs, like the well-known horsetails. The following species are grown here: *Casuarina stricta*, *C. Cunninghami* and *C. elegantissima*. They do not stand well the wind, but thrive even in dry and stony soils. They are grown from seed.

If our list of evergreen trees, is comparatively poor, we are fully compensated by the glorious family of Palms, many of which do very well in our soil and climate. The Palms are dealt with under a separate heading. Here, it is sufficient to say that the best Palms for avenues and groups are the following: *Phoenix dactylifera*, *Ph. canariensis*, *Ph. pumila*, *Ph. tenuis*, *Pritchardia filifera*, *Washingtonia robusta*, *W. Sonorae*, *Trachycarpus excelsus*, *Livistona australis*, *L. chinensis*, *Sabal umbraculifera*, and *Cocos campestris* or *C. australis*.

Deciduous trees offer a wider range of selection, although they do not often compare with evergreen trees either in beauty of habit or in adaptability.

The common Oak (*Quercus Robur*) is planted here and there in the public gardens as well as along roads. In deep and moderately moist soils it makes quick growth and becomes a fine shady tree in about ten years. There is a huge specimen in San Antonio Gardens which must be about 150 years old, with a trunk over 3 metres in circumference at the base. A variety with an erect pyramidal habit is also under cultivation. The Oak is propagated by sowing the acorns as soon as they are ripe, and like all deciduous trees, it is transplanted during winter. It is a majestic tree for avenues and should be more planted in suitable localities with a deep soil, not too dry, in rather sheltered situations. *Quercus Cerris*, *Q. rubra*, *Q. Aegilops*, *Q. pubescens*, *Q. macrocarpa*, etc. have been tried several times, always with poor results.

The Chestnut (*Castanea vesca*) has repeatedly failed to establish itself anywhere in our gardens.

The Walnut (*Juglans regia*), although strictly speaking a fruit-tree, is also a fine ornamental tree for avenues, and should be more planted in suitable localities. It is propagated by sowing the walnuts late in winter or in early spring; the finer sorts are usually propagated by grafting on ordinary seedlings. The Walnut grows very well in deep soils and in situations rather sheltered from strong winds, but a cool situation facing the north or north-west is preferable. The tree attains a large size, reaching a height of 15 metres in good situations, and the quality of its timber is as good as any obtainable in Europe. The Black American Walnut (*Juglans nigra*) has been introduced several times, but has always failed to establish itself.

The Horse-chestnut (*Aesculus Hippocastanum*) is very ornamental on account of its large beautiful foliage, and the fine panicles of pink or pale rose flowers. Occasionally it does well in deep soils, moist but well drained, and in cool and shaded situations, developing a fine head of foliage and affording a thick shade. Unfortunately its foliage is apt to dry up and burn rather extensively as early as June. With us its growth is very slow, and therefore although in other countries it is an ideal tree for avenues, in these Islands it must remain a rarity. It is propagated by sowing the "chestnuts" in winter.

*Jacaranda ovalifolia* (*J. mimosaeifolia*) is a magnificent tree, native of Brazil, which grows very well in these Islands, provided it is planted in a deep moist soil, and in sheltered situations. It is a comparatively recent introduction in Malta, having been first imported from Tunis in 1900, and again in 1908. Its growth is very rapid, becoming quite a large tree in about 12 years. Its large finely cut foliage is very elegant, and only turns brown and drops in December. In May—July the tree is covered with large panicles of lovely light bluish flowers. It is propagated by seed in March—April, the hard-shelled seed capsules, like oysters, remaining on the tree throughout the winter and maturing early in spring. It is very recommendable for planting in gardens, and along roads in sunny and sheltered situations.

*Ginkgo biloba* or *Salisburya adiantifolia*, native of China and Japan, is an old survival from ancient geological times. Its grows well in our soil and climate, but requires a red fairly

deep soil, without stagnant moisture, and a cool situation. It is propagated by seed, and in a few years grows into straight sapling about 3 metres high; reaching a height of 6 to 10 metres, with a fine pyramidal head of light green foliage, in about 25 years.

*Gymnocladus canadensis* is another fine tree with large doubly pinnate leaves composed of many leaflets. It is propagated by seed, and its growth is rather slow, but adapts itself to a dry soil. Like *Gingko biloba* it does not afford much shade, its foliage being too open in character, but it is very ornamental on account of its picturesque habit.

*Erythrina Corallodendron* is a large tree of rather slow growth, with trifoliate leaves like those of French-beans, and thick fleshy twigs slightly thorny. In spring the tree is covered with large inflorescences of deep orange-red pealike flowers. It is propagated by seed or by cuttings in February—March. The small coral-red hard seeds should be steeped in warm water for some hours before sowing. The tree requires a deep soil and a sheltered situation, and in time attains to gigantic dimensions. A huge tree of this species, planted in 1814, exists in San Antonio Private Gardens.

*Ailanthus glandulosa*, the False Shumach or Japanese Varnish-tree, is an excellent tree for avenues and roads, thriving well in all soils of sufficient depth, and is able to stand the long summer drought. It grows well in all situations, but the sea-breeze is apt to damage the foliage in spring and early summer. It is propagated by seed or by suckers. Plants raised from seed grow into fine saplings about 3 metres high in 3 or 4 years, and are less liable to throw up suckers. This tree is an old acquaintance in our public plantations and is now practically naturalised. Along with *Melia Azedarach* and *Phytolacca dioica* it constituted the 3 types of trees which were formerly predominant in our public plantations. Its stem is rarely, if ever, damaged by goats. During summer the large panicles of reddish or crimson fruits are very ornamental. The tree is late to put out the new leaves in spring, and sheds its foliage in September, so that it is leafless for a considerable part of the year. *Ailanthus flavescens* has been tried, but is altogether much less robust.

*Melia Azedarach*, a native of India, is another good tree for roads. It has large finely cut foliage, and large panicles of whitish mauve or bluish flowers produced in April—May. The tree is of quick growth and is easily propagated by seed, the seedlings growing into young trees suitable for planting out, in 3 or 4 years. It grows in all soils and all situations, but is badly damaged by the sea breeze, and is killed by an excess of salinity in the soil or by stagnant humidity, preferring dry and stony situations.

*Phytolacca dioica*, native of South America, grows to a huge size, with a thick unwieldy trunk of very soft wood. It gives a dense shade, and its lanceolate foliage of a deep dull green, is pretty, but the flowers produced in catkins are greenish and insignificant. The female trees produce an abundance of greenish berries with small black seeds, by which the tree is propagated. It was formerly much more planted along roads, but has given place to more desirable species. It resists well the drought and the wind, and is not much affected by the sea-breeze.

The White Mulberry (*Morus alba*) is here planted along roads, more as an ornamental tree than for its more utilitarian purposes, (vide: Cultivation and Diseases of Fruit-trees in the Maltese Islands). Standard trees growing along roads must have the foliage too often covered with dust, and not in a fit condition to feed to silkworms. The picking of leaves from tall trees is also difficult and expensive, and there are other considerations to take into account. The male mulberry, which of course produces no fruit, is not frequent, and as it is preferable for its vigour and the beauty of its foliage, it may be propagated by budding on ordinary seedlings. The Japanese variety "Italia," with beautiful cut, dark shining green foliage, and the Weeping Mulberry which produces little or no fruit, are very ornamental and are propagated also by budding on common seedlings. The Mulberry thrives best in a deep soil, rather moist, but a sheltered situation is not indispensable.

The Elm-tree (*Ulmus campestris*), is native or naturalised in several valleys, and grown up suckers are frequently planted along roads in moist situations or valleys. The Elm-tree is here usually propagated by the suckers which are thrown up

abundantly, sometimes at considerable distance from the stem. The Mountain Elm (*Ulmus montana*) and particularly the American Elm (*U. Americana*) are still more ornamental and are reproduced by seed or by suckers or by grafting on the common Elm. A fairly deep and moist soil is necessary for their perfect development, but will thrive also in dry and poor soils.

The Poplars are all very ornamental. The White Poplar (*Populus alba*), is native or naturalised at Bahria etc. and in moist valleys and cool situations as at Boschetto attains to a large size, becoming quite a conspicuous ornament on account of its foliage, silvery white on the under surface and shining green on the upper. The variety *P. nivea*, recently introduced, is cultivated in several public gardens, and is becoming naturalised at Boschetto. It is a smaller tree, with smaller foliage, more decidedly silvery on the lower surface. The White Poplar is commonly reproduced by suckers, and requires a moist and somewhat clayey soil along streams, and is soon killed by any excess of salinity, or by too much manure in the soil.

The Black Poplar (*Populus nigra*) with its elegant pyramidal habit, and small shining green leaves ever in movement at the least breeze, is very ornamental. Thrives well along streams or in deep soils, even if only moderately moist, and is reproduced by suckers or cuttings. Like the White Poplar, it is a splendid tree for avenues, but is rather short-lived.

The Canadian Poplar (*Populus angulata* or *P. canadensis*), now largely planted in many countries for the supply of wood pulp, is of very quick growth, becoming quite a fine tree in 4 or 5 years. It is a recent introduction in this Island, requires a deep moist soil, and is chiefly propagated by cuttings. Its large heart-shaped or triangular leaves on long stalks, are as easily moved by the breeze as in other species. It has a spreading pyramidal habit, but it is not so ornamental as the other species.

The Willows are also moisture-loving trees, and thrive best in moist cool valleys and along streams. *Salix aurita* var: *pedicellata* is a true native of these Islands, but *S. alba* and *S. fragilis* are probably naturalised. The Weeping Willow (*Salix babylonica*) is a fine tree for planting close to the margin of ponds and streams. They are best propagated by cuttings in winter.

The Ash-tree (*Fraxinus excelsior*), thrives in comparatively dry localities, but prefers a deep soil and cool situations sheltered from the wind. There are gigantic Ash-trees in the Boschetto valley, which must be more than 350 years old. These trees which hardly ever produced fertile seeds, commenced to produce such seeds very abundantly in 1922, possibly owing to cross-pollination with much smaller trees recently imported and planted amongst them. The tree is ornamental on account of its vivid green foliage, and furnishes a well known timber.

*Sophora japonica* is a fair-sized tree of the Pea family, and grows well in all soils and all situations. The very ornamental "weeping" variety is more grown than the type and makes good shade bowers. It is propagated by budding or grafting on seedlings of the typical form, at a sufficient height from the ground.

The Almond (*Prunus Amygdalus*) is a very desirable ornamental tree on account of its artistic flowering boughs, which are in flower as early as December. The colour of the flower may be white or flesh or light pink, or white with a pink eye, according to the variety. A very pretty double-flowered variety, and another variety with double-flowers, are also grown; these last being propagated by budding or grafting on seedlings of the bitter or sweet almond. The tree thrives well anywhere, but its flowers are easily damaged by wintry weather, in exposed localities. Double-flowered varieties of the Peach-tree are also grown.

*Sterculia platanifolia* is a rather tall tree, with greenish white stem and branches, and large palmate leaves. It is a fast grower, but is more curious than ornamental. It thrives well in all soils and also in windy situations, and is propagated by seed.

*Koelreuteria paniculata* is a spreading tree with large finely cut foliage of a lively green, and large loose panicles of small yellow flowers which are produced in May—June and are very ornamental and keep long on the tree. The flowers are succeeded by bladder-like capsules, at first green, turning brown when the seed is ripe. The tree is easily propagated by seed, and should be more grown than at present. Thrives well in all soils, and is resistant to drought.

The Oriental Plane-tree (*Platanus orientalis*) and the London Plane or Western Plane (*P. occidentalis*), are grown occasionally, and do fairly well in deep soils with a moist but well-drained subsoil. A huge specimen of the Oriental Plane-tree formerly existed in San Antonio Gardens, and a smaller one in the Maglio Gardens. However, in our soil and climate, both species of Plane have proved very capricious, often refusing to establish themselves and fairly to respond to the care bestowed upon them. They are usually propagated by cuttings. The Plane-trees are very ornamental; they grow to majestic proportions and are ideal trees for avenues and large squares (platea = square, hence their name), and it is unfortunate that with us they have proved so very unreliable.

*Celtis australis* is a huge tree growing well in Italy and South Europe generally. Here it grows to a fair size, but never to the dimensions as seen abroad. Perhaps this is due to the fact that all our trees of this species, of which the number is as yet very limited, are still comparatively young trees, none of them being more than 25 years old. The leaves are small, serrated, asymmetrical, but light. The tree is resistant to drought, and appears to thrive well in our soil; and reproduces itself freely by means of its small pea-like black berries or drupes. The tree has a fine habit of growth, with spreading leafy branches, and makes better growth when planted in deep soils.

The Paper-Mulberry (*Morus papyrifera*) is a native of China. It is a very fine tree, attaining to a large size and producing a thick shade. Thrives in all soils, but grows far more quickly in good moist soils and in cool situations. The tree never produces seed, all our trees being female, but it is easily reproduced by suckers which are thrown up in abundance, often at some distance from the stem. It is an excellent tree for avenues, is drought resistant, and stands a certain degree of salinity, but is easily affected by stagnant moisture.

*Cercis Siliquastrum*, the Judas-tree, is naturalised at Boschetto and elsewhere. The tree is very ornamental on account of its deep green foliage, and affords a dense shade. In spring the tree is covered with small dense clusters of pink flowers, and has a most pleasing aspect. There is a white or

very light pink variety, which is also planted here and there. It is reproduced by seed, or by suckers which are thrown up at the base of the stem. A finely variegated leaved sort is propagated by grafting or budding on the typical form. Its flowers are deep pink, but the prettily streaked round leaves are much used for table decoration. *Cercis canadensis* has the same habit of growth, with leaves of the same shape but of a lighter green, and the flowers are flesh-coloured. It is reproduced by seed, the tree usually producing large crops of pods with good seeds; but suckers are less freely thrown up around the stem.



# PALMS AND CYCADS.

**A** LECTURE on Palms and Cycads, giving full details on their cultivation, (about 30 pages in 8vo.) was read by the writer at a meeting of the members of the Malta Horticultural Society, at San Antonio, on the 18th April 1921. Here it is only possible to refer briefly to the more salient points, for the guidance of the gardener.

Palms and Cycads are grown either as pot plants, or for planting out in avenues or groups. In both cases the methods of propagation and the attention required by the seedlings and young plants in early life is the same but in subsequent stages a very different treatment is necessary.

The vitality of Palm seeds is very variable. The seed or stone of *Phoenix dactylifera* (the Date-Palm), *Ph. canariensis*, *Ph. reclinata*, *Howea Forsteriana*, *H. Belmoreana* etc. keeps good for several years. The seed of *Livistona australis*, *L. chinensis*, *Areca* etc. usually fails to germinate if kept for more than eight months. Species of *Cocos*, *Jubæa*, *Oreodoxa*, and *Chamædorea* are better sown in sandy leaf-mould. *Phoenix Rœbelinii*, *Ph. rupicola*, the *Arecas* and the *Howeas* or *Kentias* may be sown in red earth heavily charged with sandy leaf-mould. Other species may be sown in ordinary red earth, well dressed with old manure. Small seeds, such as those of *Phoenix Rœbelinii*, *Sabal Adansonii*, *Corypha umbraculifera*, *Washingtonia*, *Pritchardia*, *Chamædorea* etc. may be sown at a depth of 1 to 3 c.m., the larger seeds of *Livistona*, *Areca*, *Jubæa*, *Cocos*, *Kentia*, the *Date-Palm*, the *Canary-Palm* etc. should be sown at a depth of 2 to 4 c.m. It is always a good practice to sow the seed as soon as it is ripe, or if it is imported seed it is advisable to soak it in warm water for about 24 hours before sowing. The seed is best sown towards the close of winter or early in spring, so that the young seedlings may have the full benefit of a long stretch of warm weather in summer and autumn, but sowings can be made practically all the year. Germination may take place, in a few instances, within fifteen days, but most species commonly require from 4 to 8 weeks,

fresh seed sown directly when ripe always germinating more readily. The seeds of *Howea* or *Kentia*, *Jubæa* and *Cocos* often germinate very irregularly, the germination commencing within 6 weeks, and is prolonged to twelve months or more.

The seed is best sown in pans, or shallow-pots, or boxes. Sowings in the open ground are objectionable, as the seedlings will be transplanted with difficulty, even when very young, some of the roots will be injured, and the check sustained by the seedling too often results in its death. At the end of not less than one year, and not more than two, in March or April, the seedlings are potted off singly in small pots, the utmost care being taken not to injure the roots, particularly the new roots just forming, and to water the plants as soon as they are potted. The soil in the case of *Cocos* (with the exception of *C. campestris* or *C. australis*), *Phoenix Rœbelinii*, *Kentia* or *Howea*, *Oreodoxa*, and *Chamædorea*, should be a mixture of leaf-mould and sand, or at least good red-earth well charged with leaf-mould and silver sand. For other palms ordinary red-earth will do, but newly transplanted palms should have only a little old manure well mixed up with the soil, as they are not strong enough to bear heavy dressings.

Newly potted palms are placed in the shade for a few weeks, and those requiring sunshine and intended to be reared for planting out in the garden, are hardened off gradually in more exposed and sunny situations. However, the *Kentias*, *Cocos* and to some extent also *Chamædorea*, *Livistona*, *Corypha* etc., as well as all those palms which are meant to be long grown in pots for indoor decoration, must be placed in a warm but shaded and sheltered situation, in the shade of trees or under a trellis, to develop long and ornamental foliage of a deep shining green, and should be kept always well watered, and sprayed at least once a day, preferably in the evening. The pots should not have too many crocks, in order that when it becomes necessary to shift the palm into a larger pot, all crocks may be removed without disturbing too much or damaging the roots; and this precaution is all the more advisable in the case of palms reared in full sunshine for planting out in avenues or groups. In fact palms reared in full sunshine do not develop their foliage so well as those reared in the shade, but on the other hand the root-system is much



more vigorous, and as the roots soon become pot-bound, it is often better not to put more than one crock in the pot, or just enough to ensure adequate drainage.

Those species of palms which produce suckers can be propagated by separating the suckers in due season. *Phoenix dactylifera*, *Ph. reclinata*, *Chamærops humilis* and its varieties, etc. can be propagated in this way. In the case of the Date-Palm (*Ph. dactylifera*) this method of propagation is the only one possible to propagate the good commercial varieties. In fact, seedlings besides yielding more or less about 50 per cent. of male plants, hardly ever reproduce exactly the same variety of Date in all its qualities. The suckers or offsets are produced when the tree is still young, as when the stem or trunk has reached the height of over two metres it gradually loses its peculiarity of throwing up suckers. These should be allowed to remain attached to the mother-plant until their base reaches about 20 c.m. in diameter and has commenced to emit some rootlets. The suckers are separated from the mother-plant in spring, the foliage is trimmed back, and after allowing the suckers to stand in the shade for 2 or 3 days to harden the wound, they are planted 30 to 50 c.m. deep, putting some sandy soil around the base to drain off any excess of moisture. It is always better to wrap up the heart of the foliage in a piece of canvas in order to prevent undue evaporation, or to shade off the sucker from the scorching rays of the sun, for the next 3 or 4 months.

Other suckering palms such as *Rhapis flabelliformis*, *Chamædorea elegans* and *Areca lutescens*, are propagated by separating the well-ripened suckers in spring. Indeed, in the case of *Rhapis flabelliformis* and *Chamædorea elegans* we have here no other method of propagation, as all our plants are female and do not produce seeds capable of germination.

Certain palms, such as *Washingtonia*, *Pritchardia*, *Erythraea*, *Cocos*, *Howea* etc., suffer a great deal when transplanted from the open ground, notwithstanding all the care bestowed upon them. Others, such as *Phoenix*, *Chamærops*, *Trachycarpus*, *Corypha* etc. do not suffer very much if due precautions are taken, and soon become re-established. In all cases, it is advisable to perform the operation in March-April, or in October, and to transplant the palm with a good ball of earth. The

outer foliage is cut off, and the inner leaves along with the heart foliage are wrapped up in canvas or straw to prevent excessive evaporation. Precaution should be taken to plant the stem at least 30 c.m. deeper than its former ground level, in order to induce a copious formation of new roots around the stem, and adequate care should be taken to keep the tree well watered until it becomes re-established. In about three months the foliage may be unwrapped; but if the palm has been taken up with a large ball of earth, it is often possible to dispense altogether with the operation of wrapping the foliage.

Apart from the fact that many Palms thrive with difficulty, or not at all, in our calcareous soil, there are many beautiful tropical species which for climatic reasons it is not possible to grow here, at least in the open. Thus, such species as *Latania rubra*, *Areca* or *Hyophorbe Verschaffeltii*, *Cocos Weddelliana*, *C. nucifera*, *Arenga saccharifera*, *Ceroxylon andicola*, *Phoenixophorium*, species of *Dentrocalamus*, *Attalea*, *Elæis* etc. have been repeatedly imported and consistently failed to survive our winter, even in a greenhouse, or at most have lived on with difficulty through one or two winters, but are invariably killed by cold weather when it happens to be somewhat severer than usual. However, those species which agree well, or fairly well, with our soil and climate are sufficiently numerous and varied to command our admiration for this princely family of plants. For their noble habit and magnificent proportions, either for avenues or groups, the following may be planted even in exposed situations, with only a limited allowance of water during the summer months: *Phoenix dactylifera*, *Ph. canariensis*, *Ph. tenuis*, *Ph. pumila*, *Ph. leonensis*, *Ph. reclinata*, *Ph. rupicola*, *Cocos campestris*, *Washingtonia robusta*, *W. Sonora*, *Pritchardia filifera*, *Brahea edulis*, *B. Rœzli* or *Blue-Palm*, *Trachycarpus excelsus*, *Livistona chinensis*, *L. australis*, *Sabal umbraculifera*, *S. Adansonii*, *S. Palmetto*, and the various forms of *Chamærops humilis*. *Kentia* (*Howea*) *Forsteriana*, *K. Belmoreana*, *K. Canterburyana*, *Corypha Gebanga*, *Livistona olivæformis*, *L. rotundifolia* and others, will do equally well, but require more shelter. All species of *Chamædorea*, such as *Ch. elegans*, *Ch. elatior*, *Ch. corallina*, *Ch. Sartorii*, *Ch. Ernesti-Augusti* etc., *Rhapis flabelliformis*, *Phoenix Rœbelinii*, *Caryota urens*, *Cocos*

plumosa, *C. Romanzoffiana* etc. are best grown in pots, but *Rhapis flabelliformis* and *Chamædorea elegans* grow also into nice groups when planted out in suitable situations.

Not all palms are suitable for indoor decoration. Thus the species of *Washingtonia*, *Pritchardia* and *Brahea*, will soon turn yellow and perish in a short time if kept indoors. Others like *Chamædorea*, *Rhapis*, *Phoenix*, *Kentia*, *Livistona*, *Corypha* will resist well for long periods. For obvious reasons it is insisted upon that palms intended for indoor decoration be grown in pots of the smallest size, compatibly with the size of the plant. For this reason, the plants should be kept in a sheltered and well shaded situation, not only that the foliage may develop fully and assume its deep shining green colour, but also in order that the roots may not be pushed to greater activity and much development. For this reason it is advisable to keep the plants well watered and to spray them frequently, particularly in the evening. An earthenware saucer placed under each pot will help to maintain permanently the requisite degree of moisture for the roots. Periodical dressings of well-rotted manure, with the addition of some fish-manure, or bone-meal and wood-ashes, will furnish the necessary rich nourishment to make up for the poor development of the roots.

Those leaves which are too old or too decayed to be ornamental, may be cut off neatly close to the stem, but leaves in their full vigour, even if slightly damaged through some accident, should be respected. It is a wrong practice to deprive a palm of part of its foliage, and the removal of part of the heartleaves of Date-Palms for the Palm-Sunday ceremonies is always very injurious to the trees.

Of the Cycads, the only species commonly cultivated in our gardens and frequently made use of for house decoration, or for planting out, is *Cycas revoluta*. It has been long grown in these Islands, but although grown up specimens flower regularly, and sometimes produce fertile seed, the plant is propagated exclusively by means of the bulb-like scaly offsets produced at the base and sides of the stem, more frequently below ground-level. As many as forty offsets may be produced by one full-grown plant in one year, but the production is irregular and at best, uncertain. These offsets, with or without

roots and with or without leaves, are planted in pots, just deep enough to be covered with soil, and in a few weeks they will root and will throw up the first leaf or two; after which the production of leaves proceeds mostly once a year, 2 to as many as 60 leaves being produced at a time, according to the strength of the plant. *Cycas revoluta* is very hardy, resisting well for indoor decoration and is very ornamental, but should be always taken out and placed in a sheltered and half shaded situation during the formation of new leaves. *Cycas Rumphii*, *C. circinalis*, as well as species of *Dioon*, *Zamia*, *Macrozamia*, *Encephalartos* etc. are grown occasionally, but they are rarities in our gardens.

X.

SHRUBS AND BUSHES REQUIRING VEGETABLE  
MOULD.

UNDER this heading brief reference will be made only to the Camellia, the Azalea, the Rhododendron and the Gardenia, which do not require the shelter of a glass house. Camellia japonica is a well known evergreen shrub with very ornamental, pointed, toothed, leathery leaves of a deep shining green, and large flowers single, semi-double or double, white or red, or of various shaded between these two colours, self-coloured or variegated. Camellia Sassanqua is a tall bush with smaller single or semi-double flowers, waxy white and almost translucent. It flowers profusely in winter and spring, but is not much grown. Camellias sometimes adapt themselves to a red soil, provided that it is of a sandy nature, with little admixture of soluble calcareous rock, or at least only with chips of the hard coralline limestone which is far less easily soluble than our other calcareous rocks; the soil also must be thoroughly drained, with a rather dry subsoil. The Camellia is best propagated by seed, and the valuable varieties are propagated by grafting on seedlings, preferably by the method called "inarching." Azalea indica is likewise propagated by grafting on the more robust Azalea mollis. Gardenia florida and its variety G. Fortunei are propagated by cuttings or by rooted suckers taken in April—May, and rooted or established under a hand-glass. Rhododendron arboreum and many other species and varieties are best propagated by grafting on own seedlings. The cultivation of these plants in pots requires a great deal of care in order to insure success. The soil should consist of leaf-mould, preferably of heather-mould (*terre de bruyère*), or oak-leaf mould, or chestnut-leaf mould, well mixed with silver sand or "terra di bosco" in the proportion of 2 parts of leaf-mould to one part of sand. The pots should be crocked with broken pieces of flower-pots, preferably mixed with pieces of rotten carob-wood or charcoal, and surfaced over with broken crocks well chipped to insure perfect drainage. Notwithstanding all this care, it will be found that after the first year or two, the soil in the pot becomes so much settled as to require an

addition of the same mixture of soil, and the stem of the plant will then find itself too deeply buried. In such cases it is better to shift the plant into another pot of the same size or just a little larger, if necessary, in order that the addition of soil may be made at the bottom instead of at the surface. During the operation some of the old soil may be changed, with as little disturbance of the roots as possible, and this is of course an additional advantage, and must result in a more vigorous growth. The addition of sand prevents the mould from becoming sour, and to a considerable extent prevents the development of earth-worms which are injurious to the roots. Too much water at the roots should be avoided, but frequent or daily sprayings on the foliage made lightly, in the evening or early in the morning, will be found to be very beneficial.

All these plants prefer a sheltered situation, somewhat sunny, but too much direct sunshine should be avoided even in winter and early spring. Gardenia florida and G. Fortunei require more warmth than the other plants just mentioned, and especially in winter should be placed in a very sheltered and sunny situation, shaded by trees or by trellis-work. In early spring some well-rotted manure may be given, to assist the growth of the new shoots and the development of the flowers. The well known and much appreciated Gardenia Thunbergi which grows to the size of a large bush and is leafless in winter, may be grown in ordinary red soil, with or without the addition of sand, and its sweet scented white flowers are produced throughout the summer.

Magnolia fuscata is another evergreen bush or small shrub, dislikes a calcareous soil, and requires to be grown in leaf-mould just like the Camellia and Azalea. It is sometimes grown for the sake of the small dull yellowish flowers which have a strong perfume of cloves. All attempts to grow it in ordinary garden soil have invariably failed.

The Camellia, and particularly the Azaleas, Rhododendrons and Gardenia florida along with G. Fortunei, dislike a calcareous soil, and as our water always contains some lime in solution, after some time, by repeated waterings, calcareous matter accumulates in the soil to a dangerous amount, and to this cause more than to any other, may be ascribed the fact



that these plants and particularly Rhododendrons and Azaleas, after the first year or two, generally assume a sickly habit and gradually die off. By changing the soil in the pot, the plants will have a new lease of life, but their prolonged existence is continually menaced by the same danger.

*Magnolia grandiflora* grows to the size of a large tree in other countries, and especially in the cooler districts of Upper Italy. Here it may occasionally reach a height of 5 or 6 metres, but more commonly it is a shrub not more than 3 metres high. It is very ornamental, both on account of the foliage and of the large creamy white, single or semi-double and highly perfumed flowers, which are borne in June and July. It is usually grown in leaf-mould with "terra di bosco" or silver sand, but occasionally thrives satisfactorily in the open ground, in a well drained and sheltered locality. The leaf-shedding *Magnolias*, such as *M. stellata*, *M. Campbelli*, *M. Yulan* etc. suffer greatly during the hot period of our summer, and must be grown also in leaf-mould. *Olea fragrans*, and its red-flowered variety, are two evergreen bushes requiring the same treatment as *Gardenia florida*, and thrive best in the shade of trees, but require the shelter of a glass house in winter and early spring. Both the species and its variety are much appreciated on account of the delicate perfume of their flowers. They are propagated by cuttings, under glass, in April—May. Certain species of *Allamanda*, *Aphelandra*, *Ruellia*, *Peristrophe* etc. require the same treatment, and are perhaps more resisting to the action of lime.

*Aucuba japonica*, in its several variegated or spotted varieties, is always a fine foliage plant much in request for gardens and for indoor decoration. It should be kept in a shaded and cool locality, in well-drained pots filled with a mixture of leaf-mould and sand, with frequent sprayings overhead, but with the soil kept slightly dry. Often thrives well in red earth well mixed with sand or "terra di bosco." It is propagated by cuttings taken in February or March and planted under glass, or by division of old clumps. When both male and female plants are present, the seed sets freely, and the scarlet olive-shaped berries are very ornamental throughout the winter.

# XI.

## PLANTS UNDER GLASS.

PLANTS under glass are too varied and too numerous to be dealt with conveniently under one heading; and on the other hand to refer separately to each class of greenhouse plants would require much more space than that allowed in the present work. Hence, under this heading reference will be made rather to general greenhouse management, than to the special cultivation of the various classes of greenhouse plants.

Plants are classed by gardeners as greenhouse plants when they require a higher temperature than that of the open air, or at least a higher or more equable temperature in winter. To the requirement of a higher degree of temperature is generally, but not always, associated the need of a higher degree of atmospheric humidity, along with the absence of strong currents of air. Therefore, in our climate a greenhouse should partake of the nature of a hothouse, that is a hothouse without a heating apparatus, or with an apparatus that will be required in action only for a few days or weeks in the coldest period of the year. A distinction should be made between the severely utilitarian and efficient greenhouse and the larger and more ambitious conservatory, usually of some architectural pretensions, which is primarily meant as an adjunct to, and continuation of, the country residence, for the reception of plants in full ornamental condition, which have been grown and cared for in the greenhouse.

In order to preserve the heat, and even to do away almost entirely with the necessity of special heating apparatus, the greenhouse should not be large, and should not be constructed of metal but of other non-conductive material, principally wood, such as pitch-pine, in order to reduce as much as possible the loss of heat by radiation. The construction should be a *lean-to*, along a thick wall facing East, South-east or South, on a basement of stone, which in front should not be more



than 80 c.m. high on the inner side of the greenhouse. A greenhouse of the type here recommended should not be more than 3 metres high at the wall, not more than 3 metres wide, the front side on the inside being just over 2 metres high, and it is advisable not to have it more than 10 metres long. If more space is required, the interior may be divided into compartments by stone walls or glass partitions, into lengths of about 8 metres each, or two or more separate glasshouses constructed in suitable localities. The front side above the basement should not be of stone, in order to admit the fullest share of heat and light, but the panes of glass should be properly shaded in winter as well as in summer. A stone shelf 60 to 80 c.m. broad, is placed along the front, a few centimetres below the upper rim of the stone basement, and the shelf itself should have a rim all round, in order to hold a layer of gravel or sand 3 to 5 c.m. deep. On this layer the pots are placed, as close to the glass as may be required. A walk 50 to 80 c.m. broad will run along the shelf, and on its inner side a flight of steps or stone shelves may be constructed along the wall to receive other pots. Strong hooks or other appliances may be fixed to the roof for hanging pots or for Orchids, and a large trough of stone or earthenware is placed in a central part of the glass house, in which the water besides imparting the necessary humidity to the atmosphere, will gradually acquire the temperature of the glasshouse, so that the plants when watered will not be exposed to the chilling effect of water freshly drawn from the tap. There must be also an arrangement to ventilate the glass-house, especially in the hottest hours of the day in summer, and also whenever the air threatens to become too charged with moisture in autumn and winter, but strong draughts of air are always injurious and should be avoided at all times. All unnecessary accumulations of rotting vegetable substances, earth etc. should be removed periodically, particularly in autumn and winter, to prevent the development of moulds.

Glass-houses smaller or lower than the dimensions given above, are of course warmer, and are preferred for certain tropical plants, but they partake more of the nature of garden-frames and propagation-beds, than of a greenhouse proper.

All work in the greenhouse is best done early in the morning or late in the afternoon, as at certain seasons the excessive heat or the excessive moisture of the atmosphere may be dangerous to health.

Greenhouse plants require much more frequent spraying than watering, and indeed in most instances they are more liable to suffer from an excess of moisture at the roots than from actual want of water. The spraying should be done with a fine rose, and should be applied also to the pot and to the shelf on which it stands. However, the trickling of water from the roof of the greenhouse, whether it is rain water or condensed vapour from inside evaporation, is often injurious, chiefly on account of the difference of temperature, but also owing to the fact that droplets of moisture acting in conjunction with the irregularities of the surface of the glass are apt to act like so many lenses concentrating the sun's rays on one point of the foliage and causing scorchings. An excess of heat in summer and an excess of cold in winter, is partly prevented by putting a cover of canvas, or a cane-blind or mat close to the roof, or better at a distance of 10 to 20 c.m. away, from it, and made easily removable by a system of pulleys.

Many plants, such as *Libonia floribunda*, *Manettia bicolor*, *Peristrophe speciosa* etc. only require the shelter of the glass-house in the cold season, and are found to do well or better in shaded places in the open air for the rest of the year from May to November. Others require the shelter of the glass-house only in the early stages of their growth, such as seedlings or rooting cuttings, or even for some days when they have been shifted from one pot into another, or in the case of newly potted plants until they have become established. In other cases the plants are taken into the greenhouse some time before blooming, to improve the appearance of the foliage as well as of the flowers. Thus, it is usual for exhibitors of Zonal Pelargoniums to take their potted plants into the greenhouse about 3 or 4 weeks before the Show, in order to secure thus finer foliage and more developed and better coloured flowers. Of course a great deal of care must be taken not to overdo this practice, as a few additional days

of stay in the greenhouse are often sufficient to give to the plants an etiolated or drawn-up appearance, and render them unfit for exhibition.

On the other hand, many greenhouse plants require the shelter of glass throughout the whole year, and any attempt to take them out for any considerable time into the open air of the garden, even in specially sheltered and shaded situations, is sure to bring about a check, which may result in disaster. Thus, most tender Ferns, *Begonia Rex*, *Gloxinia*, *Pittonia*, *Peperomia*, *Marantha*, *Dieffenbachia*, *Caladiums*, *Anthuriums*, most epiphytic Orchids, *Cyanophyllum* etc., cannot bear the open air or the rooms of the house except for short intervals at a time, often suffering severely if kept out of the greenhouse for more than a few hours.

In the case of certain *Cactaceæ* and *Succulents*, which more than the vast majority of their classes, require shade, a more even temperature in winter, and a moister atmosphere, such as *Epiphyllum truncatum* and its varieties, *E. Russellianum*, *Cereus flagelliformis*, species of *Rhypsalis*, *Ceropegia Woodsii* etc., they must be kept much drier than other greenhouse plants. They also require more frequent ventilation, but are able to stand the open air in shaded localities for long periods during the summer.

Greenhouse plants do not thrive well in our virgin red earth. Even those plants which do not disagree with a calcareous soil are liable to become chlorotic if kept in the glass-house in our red soils. This soil, even when watering is very carefully regulated, is apt to become cloddy and sour, and to breed quantities of obnoxious earth-worms. The *Cactaceæ* and *Succulents* which ordinarily do well in such soil, as well as the more hardy types of Ferns, of ornamental-leaved *Begonias* exclusive of the *Rex* varieties, and all open air plants which are taken into the glass-house for any considerable period, should have their soil of the proper composition for resisting the effects of greenhouse cultivation. A mixture of red earth and "terra di bosco" or silver sand in equal parts, or at least in the proportion of one part silver sand to 2 parts of earth, generally gives good results. It is also advisable in

such cases to use red-earth which has been properly acted upon by the atmosphere for some time before use, that is occasionally watered and stirred up, and properly mixed with rotted manure. The crocks should consist of broken pieces of pots or other common earthenware, either alone or mixed with pieces of charcoal roughly broken. But the majority of greenhouse plants, all the more tender Ferns, and of course all plants disliking lime, require a soil made of leaf-mould, and as this material is also very liable to breed earth-worms and to become sour, it is always advisable to use a compost made of 2 parts of leaf-mould and 1 part of silver sand. Rotten or core carob-wood, finely powdered, is another excellent material for potting greenhouse plants, but requires also the addition of silver sand. Another material sometimes used, and always with good results, is the residue of the coffee-pot, which is obtained in sufficient quantity from the coffee-shops. This residue properly fermented for about one month, and mixed with some sand and old manure provides a good potting material for Ferns, *Marantas*, *Dracænas*, *Fittonia*, *Saintpaulia*, *Primulas* etc. It has been also long used for certain plants grown in the open air, such as *Magorium Sambac* (the double Jasmine), *Hortensias*, *Clerodendron fallax*, *Achimenes* etc., alone or mixed with ordinary red soil. But of course the ideal leaf-moulds for us are always the well-known Chestnut leaf-mould imported from Sicily or Southern Italy, and the bruyère or heather-leaf mould imported from Southern France etc. Peat and Sphagnum, as well as fern-roots or fern-fibre, and coco-nut fibre, are used chiefly for epiphytic Orchids, for epiphytic Ferns (*Platycerium*), and for other epiphytic plants such as *Tillandsia*, *Nidularium* and other *Bromeliads*, but can be used advantageously for potting many other greenhouse plants requiring a loose porous soil without any permanent humidity about the roots.

Purely epiphytic plants, such as *Tillandsia*, *Platycerium*, *Anthurium* etc., do very well when applied to the surface of a piece of rough cork, with a handful of Sphagnum or Polypody-fibre for the due developments of the roots. The plant is attached by means of brass or copper-wire, or better by means of lead-wire, but ordinary galvanized wire is quite serviceable in most



instances. The stems of *Melia Azedarach*, the Carob tree, the Almond, the Ash-tree, the common Oak etc. are desirable for epiphytic plants generally. The stems, from 10 to 20 c.in. in diameter, are cut into pieces 20 to 30 c.m. long, and one end is scooped out just enough to hold a good handful of *Sphagnum* or fibre, and there the plant is fixed by a bit of wire. Such wooden pots are excellent for *Anthuriums*, particularly *A. Scherzerianum*, *Aeschynanthus*, and *Bromeliads* generally. In the case of *Platynerium* it is sufficient to cut one end of the stem roughly in a slanting direction, and the plant is then applied to the surface on a handful of *Sphagnum* or Fern-fibre. If no *Sphagnum* or Fern-fibre is at hand, some moss can be collected from a cool valley or from the trunks of old trees, and may be used after washing in water to remove the dust and earth. Certain Ferns, such as *Lygodium scandens* etc., can be treated in the same manner. The same stems can be made into hanging baskets for *Aeschynanthus*, *Pellionia*, *Ceropegia*, *Tillandsia dianthoidea* and *T. zonata*, as well as for Orchids, Ferns and other greenhouse plants. The stems of resinous trees are not suitable for this kind of work, and the selection of stems is best limited to those species of trees in which the bark does not easily separate from the dead wood; failing which, it is more convenient to use natural or rough cork which is easily shaped into rafts or pots, the several pieces being strongly tied together with copper wire.

Some Ferns do well in cool and shaded situations in the open air. The best known of these are: *Adiantum Capillus-Veneris* (the common Maidenhair), *Pteris italica*, *P. aquilina*, *P. serrulata*, *P. longifolia*, *Asplenium Adiantum-nigrum*, *Aspidium Filix-mas*, species of *Nephrolepis* etc. but all of them grow better in the greenhouse. Some others, such as *Cyathea* and other tree-ferns, usually require a warmer temperature than that of an ordinary greenhouse, and therefore are liable to suffer during the cold months. But some beautiful tree-ferns, such as *Alsophila australis*, *Dicksonia antarctica*, *Cyrtomium falcatum*, do very well not only in an ordinary greenhouse or conservatory, but also in a cool and well-shaded and sheltered yard. Ferns are potted with leaf-mould and silver sand or "terra di bosco", the soil being firmly pressed

around their roots, as all plants loosely potted generally fail to establish themselves properly. It is also necessary not to overpot the plants. In fact, pots too large for plants cultivated in the open, are still more objectionable for plants under glass. In January or early in February, Ferns may be propagated by dividing the rootstock, at the same time taking care to remove a few of the older fronds in order to establish an equilibrium between the roots and the foliage. Water the newly potted plants very thoroughly, but afterwards spray the plants daily and keep the soil only just moist, in order to induce activity in the roots. Propagation by spores is rarely resorted to, but many Ferns will sow themselves naturally, and the mossy stone-shelves of the greenhouse often yield an abundant supply of young Ferns. However, Ferns can be sown by spreading the spores very lightly on the surface of the soil which has not been touched for some time, and has become greenish or mossy, and the sowing may be done at any time of the year, but chiefly in winter and spring.

*Begonia Rex* and other *Begonias* are sometimes propagated by seed. This should be sown in pans, spread on the surface of leaf-mould which has been previously well watered and pressed down. The pan is covered with a pane of glass, and placed in the warmest part of the glass-house or better in a garden frame. The seedlings are pricked off when just large enough to handle, and are potted separately. But *Begonia Rex* and its numerous varieties and hybrids are best propagated by means of the leaves. The leaves selected for this purpose should be rather old and well matured, and are simply placed spread out, upper surface upwards, on the stone-shelves of the glass house. The formation of adventitious buds and plants quickly follows on the cut end of the leaf-stalk, and more often on the callosity where the nerves are inserted on the leaf-blade, and indeed on any other callosity which is formed wherever the nerves are cut asunder by a clean cut with penknife. The young plants are potted off when large enough, and if the operation has been done in spring, they will be sufficiently large to be of ornamental value towards the close of summer. The same operation done in autumn will furnish a number of young plants for immediate effect in



spring and early summer. Other Begonias, such as *B. maculata*, *B. argyrostigma*, *B. metallica*, *B. Heageana*, *B. fuchsioides*, *B. nitida*, *B. arborescens*, *B. platanifolia*, *B. ricinifolia*, *B. gigantea*, most of which do well in the open and in ordinary garden soil, as well as the flowering Begonias, are best propagated by cuttings or by divisions of the rootstock in spring.

*Codiaeums* (Crotons) are often difficult to deal with, chiefly on account of their dislike for lime, but with proper attention will live for five years or more, and the beauty of their gorgeous foliage amply repays the attention which they require. They should be kept in the warmest part of the glass house in winter, but in the summer months may be placed in the open, in a warm but shaded situation, spraying the foliage every evening. They are propagated by well-ripened cuttings taken in spring and planted in a very sandy mixture of leaf-mould, under a glass bell.

There are several species and varieties of *Dracaena* with variegated foliage, and they are all desirable for the greenhouse. They do well in a mixture of leaf-mould and sand, and some of them can endure the close air of apartments for comparatively long periods. Just like *Codiaeums* they are liable to the attacks of the mealy bug and of Scale-insects, and the best way to clean them, is to take them in the open air throughout the summer, placing them in the shade of trees, in a sheltered situation, and spraying them daily.

*Marantha*, *Fittonia*, *Peperomia*, *Centrasdenia*, *Cyanophyllum*, are mostly stove plants, but do well in our greenhouses. *Marantha* is propagated by division of the rootstock in spring or early summer. *Fittonia*, *Cyanophyllum*, *Centrasdenia*, etc. are propagated by cuttings. *Peperomia*, like *Gloxinia*, *Saintpaulia*, *Sansevieria* etc. is propagated by leaves planted in leaf-mould and sand. *Anthurium Scherzerianum* is propagated by division of the rootstock in early summer. The shrubby or stemmed *Anthuriums*, *Franciscea* etc. are propagated by cuttings. So are also most species of *Philodendron*, *Pothos*, *Cissus*, *Piper*, *Thyracanthus*, *Dichorisandra*,

*Medinilla*, *Pavonia*, *Manettia* etc. in spring or early summer. The very pretty hybrids of *Streptocarpus Kewensis*, and other species of the same genus are propagated by seed sown in autumn or spring. The greenhouse Cactaceæ belonging to the genera *Epiphyllum*, *Cereus* and *Phyllocactus* are best propagated throughout the summer, by grafting on rooted cuttings of *Cereus formosissimus*, *C. triangularis*, *Pereskia grandifolia* and *P. aculeata*, as they are sure to produce weak plants if grown directly from cuttings.

XII.  
THE ROSES.

THE old tag that the Rose is the Queen of Flowers, is amply justified, at least as regards the Rose in our gardens. In fact there is no species of Rose, and hardly any variety or hybrid, which given adequately favourable conditions as regards soil and treatment, does not do well with us. Since time immemorial the variety of *Rosa gallica*, known as *R. provincialis*, in Maltese "*fiurett or Warda taz-zejt*, and the still older double variety very delicately perfumed of *R. gallica*, known in Maltese as "*Warda Xandrija*" or "*W. tal Madonna*" have been grown in our gardens. Of this last, a form producing larger flowers, but otherwise identical with the original variety, is also sometimes grown, but both of them are getting rarer every year, no doubt owing to the fact that they only flower in spring. These roses are extensively cultivated in other countries for the extraction of the well-known "otto" of roses. *Rosa gallica* in its wild form, bearing single flowers, grows wild at Wied il Ghasel, Misrah Ghonok, and other localities, and in its semidouble form is met with at Wardia, Ghain l'Istas etc. The evergreen climbing Rose (*R. sempervivens*) having small white flowers, grows wild at Wied Encita, Wied il Ghasel, Boschetto, Melleha, Wied Gherzuma and Gneina. There are many species and hybrids of roses which grow wild in subtropical and temperate regions, but the cultivated sorts, with which only we are concerned, may be classed as follows:

*Rosa Banksiae*, native of China, is a sarmentose species which attains large dimensions. It is made use of to cover pillars and pergolas, and small flowers produced in umbels or corymbs. There is a single white variety perfectly thornless, with small narrow leaves and small flowers produced in umbels or corymbs. There is a single yellow variety, as well as a double white and a double yellow variety, this last being more frequently cultivated. The Banksia Rose does not strike well from cuttings, and is propagated chiefly by layers

in March-June. Crossed with *Rosa levigata*, it has produced the variety *Fortunei* which has larger white flowers. *R. Banksiae* flowers profusely once a year.

*Rosa semperflorens*, the Bengal Rose, has a dense shrubby habit of growth, with many stems arising from the base. It is mostly evergreen and everflowering, but certain varieties like *Aurore*, *Mme. Eugene Resal* etc. are not evergreen. The old *Crimson Rose* becomes quite a large evergreen bush, and has been long cultivated in our gardens, especially by florists for the supply of its very double crimson flowers of middling size, produced at all seasons. *Cramoisi Supérieur* is an improved variety with larger flowers, less double, of a more lively and uniform crimson. *Aurore* with its abundant orange-yellow flowers on erect stems, is most desirable, and so are also *Mad. Eugene Résal*, *Mme. Laurent Messimy*, which also grows to a large size, and has middling China-rose lovely flowers, *Le Vésuve* and *Comtesse de Cayla*, *Alexine* and *Ducher* are pure white, and *vididiflora* has green flowers and is grown as a curiosity. The typical Bengal Rose has flowers of a tender rose colour. Bengal roses are very hardy, stand drought very well, and thrive in the shade or half-shade better than other roses, although most of them do very well also in open situations and in full sunshine. They strike well from cuttings, and are mostly grown on own roots, being also able to resist watering with moderately brackish water. As grafting stock, they are useless. The sarmentose varieties *Climbing Cramoisi supérieur*, *Climbing Narbonnand*, *Malton*, and especially *Gruss an Teplitz*, are also useful for covering low walls or posts, but are less resistant.

*Rosa borbonica* is a cross between *R. gallica* and *R. semperflorens*, and has given origin to numerous valuable varieties and hybrids. The best known is *Souvenir de la Malmaison* but others, like *Hermosa*, *Imperatrice Eugene*, *Mad. Moser*, *Mad. Pier Oger* etc. are also cultivated. There are also climbing or half-climbing varieties, such as *Climbing Souv. de la Malmaison*, *Philemon Cochet*, *Zepherine Drouhin* etc. These hybrids are ever-flowering, and usually produce very fine and better coloured blooms in autumn and early winter. They are often grown from cuttings or layers, but should be rather grafted on the briar or better on the Scotch rose,

The Scotch Rose is a dwarf bush, with many stems arising from the base, and is in flower all the year. Its small, semi-double pink flowers are pretty, but this Rose is particularly valuable in our gardens as grafting stock for most other roses. It is very resistant to drought, does equally well in full sunshine as in the shade, and is also resistant to a certain degree of salinity in the soil, an important quality for those gardens where there is only second class or brackish water available for irrigation. It strikes most easily from cuttings and is a quick grower. A sarmentose variety, producing long erect or half-climbing stems, is equally good as stock, and is preferred as grafting stock for standards or half-standards.

*Rosa centifolia* is rather a race than a species, and has been in cultivation for long ages. The so-called Genoa Rose, sometimes called Painters' Rose, was formerly a familiar plant in all country-yards. It is practically scentless, but its form is admirable, and is of a light pink colour, with petals of good substance. It is practically thornless, and is easily propagated by cuttings. The Moss Roses (*Rosa muscosa*) are considered as derived from *R. centifolia*. They are remarkable for the thick green hairs or excrescences on the calyx and sepals. Some varieties have a second and smaller crop of flowers in autumn, but they have failed to become popular in our gardens.

The Damask Rose (*Rosa damascena*) is largely cultivated in Bulgaria, Egypt and Southern France for the extraction of "otto" of roses. It is a double or semi-double pink rose of middling size, very sweet-scented. There are also white varieties, like *Botzaris* and *Mme. Hardy*, as well as lively pink forms. It is propagated by cuttings or by rooted suckers taken close to the stem.

*Rosa rugosa* is native of Kamtschatka, and is very resistant to low temperatures. It is liable to suffer in full sunshine in summer, and is rarely grown here, although it has some really fine varieties.

*Rosa lutea* and *R. sulphurea* are noteworthy for giving origin to the well-known *Persian Yellow*. This Rose grows to the size of a large bush, much branched. Strikes well from

cuttings and is also propagated by suckers or rooted stems taken close to the base or at some distance from it. The foliage is light green and deeply toothed. The flowers are middling, very double, of a deep golden colour, with a disagreeable odour. This Rose has been long grown in our gardens, and is still frequently met with. The pruning must be of the lightest description, just to clean the plant from dead or sickly twigs, otherwise no flowers are produced. Persian Yellow crossed with other species and varieties has given origin to the well known, and now very popular race, called *Rosa Pernetiana*, such as *Soleil d'Or*, *Rayon d'Or*, *Beaute de Lyon*, *Entente Cordial*, *Juliet*, *Mad. Eduard Herriot*, *Soleil d'Angers* etc., which however are neither as hardy and resistant, nor do they form such large bushes as the original Persian Yellow, although the flowers have lost the disagreeable odour, and are really very refined and beautiful. They strike well from cuttings, but do better when grafted or budded on the Scotch rose.

The *Polyantha* Roses (*Rosa multiflora*), include sarmentose or climbing varieties as well as dwarf forms suitable for borders. The *Polyantha* Roses are known to our gardeners by the name *ghirlanda*, although this name is now given also to the climbing varieties of *Rosa Wichuriana*. They flower only once a year, but very profusely, each branch terminating in large and dense panicles of small flowers. They are very hardy and resistant to Rose-mildew, and thrive well anywhere. They are reproduced easily by cuttings or layers. The dwarf sorts and particularly the recent varieties, which are more or less ever-flowering, are preferred to the ramblers and are fast growing in popularity, such as *Orleans Rose*, *Gloire de Polyantha*, *Jeanne D'Arc*, *Perle d'Or*, *Mme. Norbert Lévassieur*, *Perle des Rouges*, etc.

The *Wichuriana* Rose is leafless in winter, and is a fast grower, covering walls and large pergolas in a few years. It has given origin to a number of glorious varieties, deservedly very popular, which have ousted from our gardens the old *Polyantha* ramblers. It is sufficient to name such varieties as *Crimson Rambler*, *Non Plus Ultra*, *May Queen*, *Hiawatha*, *Excelsior*, *Dorothy Denison* and especially *Dorothy Perkins*, to bring to the mind the splendid panoply produced by these ramblers, which moreover, although they usually flower only once a

year, commence flowering rather late in the season, at a time when other roses are becoming scarce or have ceased to flower. All of them are easily reproduced by cuttings or layers, have a hardy constitution, and are not affected by brackish water.

The Noisette Roses (*Rosa Noisettiana*) are a class of Hybrids obtained in America by Philippe Noisette, towards 1814. They and their hybrids are more or less popular with rosierists, especially the sarmentose or half-sarmentose sorts, such as Aimée Vibert, Chromatella, L'Ideal, Celine Forestier, Alistar Stella Gray, Reve d'Or, and particularly William Allen Richardson, which is much in request for hand-bouquets and button-holes on account of its pretty bud of a fine yellow orange colour. They strike root with difficulty from cuttings, and are mostly propagated by grafting or budding or by layers, and thrive best in half shaded localities exposed to the east.

The exquisite Tea Roses and the Hybrid Teas (*Rosa Thea*, or *R. indica fragrans*), along with the numerous race of Hybrid Perpetuals, constitute the bulk of the roses cultivated in our gardens, and to them more than to any other class the title of Queen of Flowers is usually applied. The Tea Rose is native of India or perhaps of China, and is remarkable for its grateful tea scent. The Hybrid Perpetuals are mostly odourless, but there are notable exceptions having either the "tea" odour, or the equally agreeable perfume of *Rosa provincialis*. However they make up for this deficiency by the large size, the exquisite shape and colour, and the beauty of the flowers. They are probably the result of crossings between the Tea Rose and the Bengal Rose and also the Provence Rose or *Rosa gallica*, and are more hardy than the Teas and Hybrid Teas.

The Tea Roses and Hybrid Teas include both dwarf or bush and sarmentose varieties. Some of them are easily propagated by cuttings, others are far less easy to grow in this manner. They are generally layered, or better grafted or budded on the Scotch rose, which also imparts to them greater vigour and greater resistance to drought and to the action of brackish or hard waters. All of them are more or less perpetual flowering, usually producing as large an autumn crop of flowers as the spring crop. The following is a list of the best Tea Roses

in our gardens: *Adrienne Christophe*, *Archiduchesse Marie Immaculée*, *Auguste Comte*, *Beauté Inconstante*, *Catherine Mermet*, *Docteur Grill*, *Lady Roberts*, *Mme. Constance Soupert*, *Mme. Hoste*, *Mme. Lambard*, *Marie Van Houtte*, *Maman Cochet* and its white form, *Papa Gontier*, *Sapho*, *Safrano*, *Perle des Jardins*, *Souv. de Catherine Guillot*, *Souv. de Pierre Notling*, *Adele Hameau*, which is superb in autumn. Among the sarmentose or climbing Tea Roses, the following well deserve cultivation: *Marechal Niel*, *Duchesse d'Auerstaedt*, *Reine Marie Henriette*, *Gloire de Dijon*, *Madame Berard*, *Mad. Jules Graveraux*, *Princesse Stephanie*, *Lady Hillington*, *H. G. Richardson*.

The Bush or Dwarf Hybrid Teas include: *Antoine Rivoire* an admirable rose of sturdy constitution, with large flowers of a tender flesh colour; *Charles Leveque*, *Belle Siebrecht* fine but rather delicate; *Bessie Brown*, *Dean Hole*, *Etoile de France*, *Glorie Lyonnaise* which is practically spineless, *Jonkheer J. L. Mock* a magnificent rose, *Jeanne Masson*, *Kaiserin Augusta Victoria*, *La France*, a well known rose exquisitely scented, *Laurent Carle* with large damask-red flowers, *Mme. Abel Chatenay*, *Mme. Caroline Testout*, *Mad. Jules Grolez*, *Mildred Grant*, *Richmond*, *Sunburst*, *Warrior*. Among the Hybrid Tea Ramblers the following are well worth growing: *Climbing Caroline Testout*, *La France de 89*, *J. B. Clark* and *Ards Rambler*.

The magnificent class of Hybrid Perpetuals include the following varieties which have given a good account of themselves in our gardens: *Baronne Prevost*, *Berthe Gemen*, *Captain Christy*, *Commandeur Jules Graveraux*, *Commandeur Felix Faure*, *Countess of Oxford*, *Eclair*, *Frau Karl Drushki*, *General Jacqueminot*, *George Dickson*, *Hugh Dickson*, *Her Majesty*, *Jules Margottin*, *Louis Van Houtte*, *Mme. Luizet*, *Magna Charta*, *Margaret Dickson*, *Merveille de Lyon*, *Paul Neyron*, *Ulrich Brunner fils*, *General Mac Arthur*, *Xavier Olibo*, *Belle Angevine*, *Gloire de Bourguignonne*, *Scipion Cochet*, *Jean Liabaud*, *G. Arends*.

The Rose thrives best when planted as isolated specimens, in a place not too close to the roots of large trees, where it can grow in a half-wild condition, without too much interference or codling on the part of the gardener. Bulbs, such as Hyacinths and Narcissi, which are not watered in summer,



agree well with it; but among other flowering plants only a few Carnations or Zonal Pelargoniums, can be tolerated in close proximity to the Rose. The flower-bed where summer annuals are grown, and which has to be frequently watered in summer, is not a desirable place for roses. Too much digging, too much manuring are as injurious as too much watering, as the Rose like other plants bearing the true stamp of Nature's nobility, resents the codling to which it is often subjected by the officiousness of gardeners and amateurs. In fact we see it growing most luxuriantly, and living for many years, often for over 25 years, as an isolated specimen between the rows of orange-trees, or in some out of the way corner in the garden, where it only receives an occasional pruning and an autumnal mulching with manure, but hardly any watering whatever. Usually such roses require to be watered only for the first year or two, until they become thoroughly established, and then they are able to shift for themselves. However, roses planted in beds or in rows will have to be watered periodically every ten days or two weeks during the summer, otherwise they may get too weak, and fall an easy prey to the many insect pests and fungous diseases to which the Rose is liable; and many branches will die off as a result of the inadequate supply of moisture sent up by the roots.

Autumn is the best time to transplant the Rose, this work being mostly done in October, November or December, although of course transplanting can be performed with perfect safety until the new shoots commence to develop in March, and the plant is once more in active vegetation. From that moment, and until October, roses can be transplanted from the open ground only with great difficulty and at considerable risk, even if due precaution is taken to transplant with a good ball of earth. Transplanted roses should be cut back to one-half or one-third of their length, and if not planted immediately, the roots should be protected from drying, by burying the roots along with part of the stem in a trench, and watering once or twice, until with improved weather the soil becomes in a fit condition for working. It is a good custom before planting to cover the roots with a layer or casing of mud. This is done by putting some garden soil

in a pail and adding enough water to give it the semi-fluid condition of thick gruel, then the roots are steeped into the pail and the thin layer of mud which adheres to the roots is allowed to dry a little, for a few minutes, before planting. This simple operation is always attended with very good results, as thus the soil gets into more intimate contact with the roots and the formation of rootlets is thereby promoted.

The distance apart at which roses are planted must vary according to the development which that particular rose is expected to have. Certain sorts, as *Soleil d'Or*, *Juliett*, *Mad. Jules Grolez*, *Grace Darling* etc. may be planted even less than 1 metre apart; others, like *Charles Leveque*, *Maman Cocket*, *Archiduchesse Marie Immaculata*, *Frau Karl Druschki*, *Panaché d'Angers*, *Auguste Comte* etc. should have from one metre and a half to two metres. The ground must be deeply trenched and manured at least one month before planting, and the roots of the young rose-tree should be carefully spread all round, and the soil firmly pressed down around the stem, keeping the grafting point of the stem at or just below ground level. Should the weather be too dry, the plants must be watered immediately after planting. The ground around the plants should be kept well free from weeds throughout the winter and spring. Planting early in autumn, that is in October at the earliest opportunity after the first autumnal rains, provided that the soil is well soaked with rain and the weather has cooled, but is yet sufficiently warm to induce active growth, presents the advantage that the plants will establish themselves at once, if not by the development of many new shoots, at least by the formation of many rootlets, so that the plant finds itself already at home when active vegetation is started in the following spring.

Roses grown in pots can be transferred to the ground at any time, although of course this is best done in autumn. However, as pot plants few roses will give satisfaction, and it is not advisable to grow them in pots at all, except for the purpose of having a few ready at hand to fill up gaps in the rose-bed or rosary.

The pruning of roses is done in winter, that is in December-February, but hard pruning should be performed only

every 2 or 3 years. Each year the roses should be trimmed to shape, the twigs shortened, and all dead and useless wood removed, but hard pruning resulting in the removal of old stems and in greatly reducing and opening up the plant should be undertaken with great care. The Rose should not be subjected to any hard pruning for the first two years after planting. Pruning and even hard pruning is sometimes done early in autumn, towards the first two weeks of September, or soon after the first rains, and then this operation is usually associated with a liberal manuring, followed by a good watering, twice or three times, which at once throws the plant into very active growth and thus a fine crop of flowers is obtained in autumn and early winter.

The seed-vessel, that is the calyx or receptacle of the flower which persists on the plant when the flower has faded, is always unsightly, except in a few cases of single-flowered or semi-double sorts having the seed vessels or fruits decidedly ornamental when ripe and well coloured. These fruits are also a source of exhaustion to the plant, and should be removed as soon as the flower has faded, to prevent a useless expenditure of vegetative energy. The pruning of climbers or sarmentose roses may be done generally on the same lines as stated; but in the case of the Wichuriana Roses and also of the sarmentose Polyantha Roses, hard pruning may be resorted to as soon as the plants have done flowering in early summer, in order that they may have time to throw up again strong shoots which will mature thier wood during the autumn, and will be in a condition to flower profusely in the following spring. In any case, hard pruning should not be carried to excess, and the gardener should remember that what may be good practice in other countries, may be wholly inadvisable in this. The system of cutting down the plant altogether after flowering, if followed here, will more often result in the death of the plant, or at least in greatly impairing its health and vigour. At all times, but particularly during the growing season from March to October, the Rose will suffer severely, if pruned so hard as to deprive it of most of its vegetative organs above ground.

Roses are budded by foreign nurserymen chiefly on the Austrian Briar and on the Manetti Rose. In a few instances

standards are also budded on the Banksia Rose. However neither the Austrian Briar nor the Manetti Rose are very suitable for our soil and climate, and the Scotch Rose along with its sarmentose variety have proved by far to be the best stock for us. They are very readily propagated by cuttings from October to March, so that their propagation on a fairly large scale presents no difficulty. Rootlings raised from cuttings in autumn or winter, are often budded in the course of the following spring and summer, or grafted at ground level in the following winter. So that our rosierists will do well to import only one or two plants of each of the varieties which they prefer, and then proceed to raise all the plants which they require, by budding or grafting on the Scotch Rose, in order to secure hardier and stronger plants, besides of course the resulting economy.

Standards can be budded at 1 metre above ground, on strong, well rooted and established suckers of the sarmentose form of the Scotch-Rose, and these will be found to give much more satisfaction than the imported standards, which are known here to be very short-lived. However, even on the Scotch Rose stock, standards are liable to suffer from the scorching of the stem during the hottest period of summer, and therefore it is advisable to protect the stem with a covering of canvas, at least until the plant has formed a nice head of foliage sufficient to shade its own stem. Half-standards do better, and do not generally require this precaution.

Those who desire to have a good supply of autumnal roses will do well to plant the following varieties: *Etoile de France*, *Paul Neyron*, *Souv. de Pierre Notting*, *Maman Cochet* and its white variety, *Adele Hameau*, *Aurore*, *Medea*, *Archiduchesse Marie Immaculata*, *Viscountess Folkestone*, *Charles Leveque*, *Mad. Jules Grolez*, *Mrs. Edward Mawley*, *General Mac Arthur*, *Dorothy*, *Antoine Rivoire*, *Auguste Comte*, *Sappho*, *Beauté Inconstante*, *Laurent Carle*, *Captain Christy*, *Mrs. John Laing*, *Rhea Reid*, *Yvonne Vacherot*, *Mad. Segond-Weber*, *Mad. Eugene Resal*, *Frau Karl Druschbi*, *William Allen Richardson*, *Jonkheer*, *J. L. Mock*.

I should not conclude this brief note on the cultivation of the Rose, without referring to a very interesting method

of propagation, viz: that by seed. Many roses produce seeds and others can be hybridized to secure seeds from them. The seed may be collected when the receptacle or seed-vessel is well coloured and perfectly ripe. The seed may be sown in spring or early in autumn, in shallow pots or pans, using a good mixture of red virgin soil, manure and leaf-mould. In about 2 to 3 weeks the seed will germinate, and the young plants will not take long to show their first flower. This is of course very tiny and not of much value to give a just hint of the true proportions of the flowers in the grown-up plant, but is sufficient to give a more or less correct idea of the colour, the shape of the bud, and other qualities. Very often beautiful new varieties are obtained in this way, and thus the grower has the satisfaction of growing what are really, and in the fullest meaning, his own roses.

The Rose is subject to many diseases and pests, but the following summary includes only the more important, which are often the cause of much havoc and disappointment.

The Rose Mildew (*Sphaerotheca pannosa*) is common especially on the young shoots developed in summer and autumn. This fungus covers with a powdery white formation, which is its mycelium and fructifications, the stem, leaves and buds, often distorting the leaves and the buds and preventing their development. It is kept in check by spraying lightly with a solution of about 4 grammes of sulphide of potash in 1 litre of water, roughly one part in 250 parts of water, by weight. Spraying with a weak sulphur-lime mixture is also effective; and dustings with sulphur have also given good results. The rose-mildew is especially fatal to seedlings.

The Rose Aphis, a minute greenish insect in numerous colonies on the growing shoots, is frequent all the year, but more so in spring. It is cleared off by dustings of precipitated sulphur containing nicotine (Schloesing's), or with a spray of a nicotine solution, or with such sprays as katakilla, solutions of plantol, carbolineum etc.

Clethra (*Labidostomus*) taxicornis is very common in spring, devouring the foliage of vines and of other trees and plants, and collects in quantities on the rose-bushes de-

voraging and destroying the flowers as soon as they commence to bloom. This is a small beetle, about 1 c.m. long, with orange-yellow wing-cases or elitræ, the rest of the body being shining greenish black. Its grub lives in decaying vegetable matter and undergoes its metamorphosis in the ground. Hence, the only effective remedy consists in collecting the adult insects by hand, and destroying them. There are deterring or poisonous sprays and dustings, but their use is objectionable as they are sure to damage the flowers.

The same may be said of the two black beetles *Oxytharea* (*Leucocelis*) *funesta* and *Epicometis squalida*, the well known and truculent "busuf". The first is black with small white dots, and the other is of about the same size or just smaller, black with yellow-hairs. They are injurious to the flowers of many other plants and fruit-trees in spring, as well as to field-crops in flower, but are particularly partial to roses, especially to white or light-coloured roses, dark coloured or red roses apparently being almost invisible to these insects. Their grubs have the same habit as those of *Clethra*, and in spring the beetles come out of the ground in vast numbers to renew the damage. The remedy is to collect them by hand, and throw them in petroleum or otherwise destroy them.

The beautiful large Rose-chafer (*Potosia floricola* var. *cuprina*) is far from common, and the damage caused by it is never important.

There are many Scale-insects which attack the Rose. *Icerya Purchasi* is very well kept in check by the small lady-bird *Novius cardinalis*, and the White Scale (*Aspidiotus Hederae*) is preyed upon by other ladybirds; but much more dangerous is the Red Scale (*Chrysomphalus dictyospermi*) which greatly exhausts the plant, and kills it outright. The beautiful rose Antoine Revoire and also Frau Karl Druschki are very susceptible to the action of this Scale-insect. It is kept in check by sprayings with sulphur-lime mixture, during winter.

## THE CACTACEAE AND OTHER SUCCULENTS.

THE fleshy-stemmed or fleshy-leaved plants are often included by gardeners under the same name of Succulents, and their cultivation is more or less carried on on the same lines. The most important Succulents are of course the Cactaceae, which, with very few exceptions, are fleshy-stemmed, with or without fugacious fleshy leaves, and with the exception of two or three species of *Rhipsalis* natives of the West Coast of Africa, are all natives of America, growing chiefly in arid regions from California and Utah to Chili. On account of their strange forms the Cactaceae have been always the object of much interest to gardeners as well as to naturalists; and many species produce flowers which although of a fleeting character, stand well a comparison with most other flowers. It is only among the Zoophytes of the genus *Cerianthus*, which inhabit the bays of the Mediterranean Sea, that we meet with forms of life which remind us of the magnificence and colouring of the flowers of the night-flowering *Cerei*, such as *Cereus grandiflorus* and its varieties, *C. Macdonaldi*, *C. speciosissimus*, *C. rostratus*, etc., to which wonderful flowers the enthusiastic admirers give the generic title of "Queen of the Night."

However, most species of Cactaceae are interesting especially on account of their curious stems and habit of vegetation, such are the species belonging to the genera *Echinocactus*, *Echinopsis*, *Opuntia*, *Mammillaria*, *Anhalonium* and *Peleciphora*. Succulents are also found among the vast genus *Euphorbia* (*Euphorbiaceae*), which are also characterised by the presence of abundant milky juice having acrid properties. This milky juice does not exist in the Cactaceae, except to a slight extent in the species of *Mammillaria*, and then it is devoid of acrid qualities. The succulent species of *Euphorbia* are natives of the arid regions of Africa, from Morocco and the Canary Islands to the Kalahari desert. They are devoid of the spiny bristles so characteristic of the Cactaceae, but may have one or

more thorns on each side of the caducous leaves or at the axil. Their flowers are usually inconspicuous, but exceptionally the bracts surrounding the flowers may have a lively scarlet colour, such as in *Euphorbia fulgens* and *E. splendens*.

Other succulents, such as the pretty shrub-like *Portulacaria afra*, and the many species of *Crassula*, *Rochea*, *Echeveria*, *Sedum* belonging to the family *Crassulaceae*, as well as some species of the genus *Kleinia* belonging to the *Compositae*, and the many species of *Mesembryanthemum* belonging to the *Ficoideae*, are always welcome in a comprehensive collection; and indeed some of them, such as *Crassula lactea*, *C. coccinea*, *Rochea falcata*, *Mesembryanthemum edule*, *M. acinaciforme*, *M. frutescens* and other species, are highly ornamental on account of their flowers, while many species of *Echeveria* and *Sedum* are valuable on account of their foliage.

To the Succulents above mentioned must be added the long list of species and varieties included in the genera *Aloë*, *Haworthia*, *Gasteria*, *Yucca*, belonging to the *Liliaceae*, and also the many species of *Agave*, *Fourcroya* etc. belonging to the *Amaryllidaceae*, some of which are of magnificent proportions and are always a striking object, either isolated or in groups.

With the exception of *Crassula lactea*, *C. coccinea*, *Rochea falcata* and a few species of *Sedum*, which thrive better in a siliceous soil, and require at least a mixture of red-earth and silver-sand or "terra di bosco" in equal proportions, all other Succulents do well in ordinary red earth, although all of them thrive much better and develop their characteristics to the fullest extent, when grown in a mixture of red earth and silver sand, or even in a soil made of red earth and loose gravel or sand, with chips of hard stone. The pots must be well crocked to secure thorough drainage, and it is well to add to the crocks a few pieces of broken bones, which in a short time will be surrounded by masses of greedy rootlets. Bone-meal or bones smashed into small chips are added with advantage to the compost in which Succulents are grown, or if at hand, powdered apatite or phosphatic rock, or superphosphates, are added to impart vigour of growth. The common road dust or sand, taken from roads which have been metalled with hard-stone



spalls affords an excellent material to mix with virgin red earth for potting Succulents in general. It keeps the soil always loose and open for the roots, besides facilitating drainage. Well-rotted cow-manure is the best for Succulents, but any other rotted manure is also good if given in smaller quantities at shorter intervals.

Most Cactaceae are propagated by cuttings, from April to September, and that is also the time to shift grown up plants into larger pots. The cuttings should be allowed to dry a little in the shade, for about 3 days, in order that the wound may harden, and so preventing the cutting from rotting off when planted. It is better to withhold all manure from the soil in which the cuttings are planted, until they are well rooted, and any excess of water should be also avoided, the soil being kept rather dry. Some species, especially in the case of monstrosities with fasciated stems, propagation may be done by grafting on the typical form of the same species as stock, or on *Cereus speciosissimus*, or *C. triangularis*, or *C. peruvianus*, or *Opuntia vulgaris*, *O. Tuna* etc. according to the type of the plant which it is desired to propagate. The grafting is done in late spring to the commencement of autumn, on rooted cuttings, and the operation is performed by removing the rind or epidermis for a length of 1 to 2 c.m. at the base of the scion, and inserting the scion in a split made by a penknife on the top of the rooted cutting, and if it has a tendency to slip off, the scion is kept in place by tying or by driving a brass pin through the stock and scion, removing the pin after one or two days, when it will be found that the scion has adhered to the stock and will not slip off again.

The Cactaceae like to bask in full sunshine, and in exposed situations, particularly in autumn and winter, at which time if kept in close or too shaded places they are apt to suffer from rot or wet gangrene. There are a few exceptions to this rule, in the case of *Epiphyllum*, *Cereus flagelliformis* and the species of *Rhipsalis*, which may get scorched if kept for many days exposed to direct action of the sun. The climbing Cactaceae, mostly belonging to the genera *Cereus* and *Pereskia*, produce adventitious roots, by which they are able to take hold

of, and establish themselves on, the rocks or on the stems of trees, and their snake-like stems are in agreeable contrast with the beauty of their flowers.

The Cactaceae and most Succulents are specially suitable for the rock-garden, and indeed they show at their best when growing among stones and rocks, where they thrive well and grow to fine specimens with little attention, beyond periodical waterings and an occasional weeding, and moreover they are little affected by long periods of drought. Some genera, like *Mammillaria*, *Echinocereus*, *Echinopsis*, *Echinocactus* and *Peleciphora*, are caespitose, and form nice clumps of specimens when grown in large pots.

The Succulent species of *Euphorbia* are numerous and mostly ornamental, on account of their strange Cactus-like habit. They require the same treatment, but of course are not notable for the beauty of their flowers. Their milky juice is acrid and poisonous, and although in many species the leaves are wanting or are minute and fugacious, in others they are large, and often more or less persistent. The principal species grown in our gardens are: *Euphorbia fulgens*, the well known species with long creeping or semi-erect stems furnished with long soft solitary spines, and flower with scarlet bracts, common in gardens and country-yards, *E. splendens*, *E. canariensis*, *E. caerulescens*, *E. caput-medusae*, *E. candelabrum*, *E. octangula* and *E. grandicornis*. They are propagated by cuttings taken in spring or summer, and treated like cuttings of Cactaceae.

The numerous species of *Crassula*, *Cotyledon*, *Roehea*, *Echeveria*, *Mesembryanthemum*, *Sedum* etc., are likewise propagated by cuttings, taken at any time from spring to autumn. *Crassula lactea* with its corymbs of milk-white flowers, and *C. coccinea* with its large fiery scarlet corymbs, are very ornamental, and require a compost of sand with no more than half its volume of virgin red-earth. A mixture of mould and "terra di bosco" or silver sand agrees with them better. Such is also the case with *Roehea falcata* or *Crassula falcata*, which is highly prized on account of its vivid scarlet flowers produced in large terminal corymbs early in summer. Some species of *Sedum* are troublesome to grow, and require a compost more

or less free from lime; but all other species do well in ordinary garden soil. Some Sedums, such as *S. minimum*, *S. dasyphyllum* etc., are often propagated by simply breaking them up, and spreading the small fleshy leaves on the surface of the soil, each leaf giving origin to a plant. So also *Bryophyllum calycinum* produces numerous plants all round the margin of the leaf, in the angles between the teeth.

The many pretty species of *Gasteria* and *Haworthia* are always welcome in a collection, and where there is room enough, the cultivation of the stately species of *Aloë*, and especially of *Agave* and *Fourcroya*, should be attempted. *Aloë frutescens* and *A. arborescens* make large clumps more than 2 metres across, and produce their deep orange scarlet flowers in mid-winter. *Aloë ciliaris* is a dainty creeper and can be trailed around the stems of trees, often rising up to a height of 3 metres or more. *Aloë distans*, *A. prolifera* etc. are pretty pot plants; but such species as *A. vulgaris*, *A. variegata*, *A. ferox*, *A. africana* etc. require large pots, or a larger space in the rock garden. The stately *Agaves*, such as *Agave americana*, *A. appianata*, *A. heteracantha*, *A. rigida* var: *Sisalana*, *A. Lindeni*, *A. mitraeformis*, *A. ingens*, *Fourcroya gigantea* and others, when well grown always compel admiration, especially when they send up their immense panicles of flowers, after a varying period of active vegetation. In some instances, as in the case of *Agave rigida*, *A. serrata* etc. a huge quantity of bulbils is produced on the panicle, after the flowering is over, and these bulbils or small plants may be utilised to propagate the species. In the case of *Fourcroya gigantea*, which produces no offshoots, and generally no seed, these bulbils are the only means of propagation. Other species of *Agave* are highly ornamental pot plants, such as *Agave Victoriae Reginae*, *A. Lindeni* etc. *Aloë* (*Gasteria*) *longifolia* is easily propagated by offshoots, and more readily by cutting off and planting the leaves, each of which produces one or more plants from the callus on the cut end planted in the soil.

The group of species forming the genus *Yucca* of the Liliaceae, as well as the genera *Beaucarnea*, *Dasylirion*, *Acrotrichum* and *Doriantes*, are often magnificent plants well worthy of cultivation, where space can be spared for them.

Thus *Yucca gloriosa* forms large clumps which produce large panicles of pure white, bell-shaped flowers, and its variegated-leaved form has the additional advantage of its ornamental foliage. Like other *Yuccas* it is propagated by cuttings, and thrives well in any soil, requiring very little attention. *Yucca reclinata* is another species with long glaucous reclining foliage, and large loose panicles of white flowers, and is propagated by cuttings, offshoots, or by the rhizomes or tubers which are produced around the stem. *Yucca Desmettiana* and *Y. filamentosa* are two other species frequently grown. The first is slow-growing, with reddish foliage, and with the habit of *Y. gloriosa* but much dwarfer; the second has the habit of *Y. reclinata* but is dwarfer, and the foliage is shorter and more rigid, and furnished with filaments along the margin. *Yucca aloecifolia* grows to the size of a large tree, with a tall erect branching habit, and has large light green foliage. It is propagated by cuttings, and its panicles of white flowers are much smaller than those of *Y. gloriosa*. Other species of similar ornamental value, such as *Y. elephantipes*, *Y. decipiens*, *Y. Whippleyi*, *Y. anstralis*, *Y. constricta*, *Y. flaccida* etc. are grown occasionally, and are still rare in collections, but their cultivation presents no difficulty.

# XIV.

## BULBS.

**B**ULBS are always appreciated, and are indeed often indispensable in any garden. They supply an abundance of flowers at a minimum of expense and trouble, often at a time when other flowers are scarce; and when their management is properly understood, there is no class of plants which give more satisfaction or are less exigent in their requirements. Of course, there are certain bulbs, such as most of the Lilies, which cannot thrive well in a calcareous soil, and therefore their cultivation cannot be attempted here with real success. There are also bulbs and roots which require a colder and moister climate, such as the Lily of the Valley, *Scilla sibirica*, *S. bifolia*, *Chionodoxa Luciliae*, *Galanthus nivalis*, *Leucojum vernum* etc., which do not thrive well with us except in a few naturally cool and favoured localities. There are others, again, like *Montbretia*, *Anomatheca*, *Gladioli* etc. which are late flowering and therefore require watering until their flowers are over. There are a few, like the tuberose (*Polyanthes tuberosa*) and the Day-Lilies (*Hemerocallis flava*, *H. fulva*) etc. which develop and flower in summer, and in colder countries are grown as stove-plants. But there is a vast assemblage of bulbs and roots of all types, from which to make a selection.

The frequent complaint advanced by gardeners and amateurs that bulbs soon degenerate when grown here, is due to a misapprehension as to their requirements, and therefore to defective cultivation, consisting mostly in too much attention and too much codling. The following excerpt taken from a lecture "On Bulbs" delivered by the writer at a meeting of the Malta Horticultural Society on the 9th May 1920, fully explains the cause to which the frequent failures may be ascribed. "It should be remembered that bulbs are highly specialised plants, having a well-defined dormant or resting period, the bulb itself serving the purpose of a store where the plant accumulates material for the next period of active growth. Hence all true bulbs must have a period of rest, and in their native haunts this resting period coincides with the period of drought and heat, or in other words, with summer. If we try to pro-

"long the period of active vegetation by undue watering, the foliage will remain green at the expense of the nourishing material stored in the bulb, which thus loses its importance; the bulb breaks up into numerous offsets, dwindles away, and soon rots off altogether. This is the common experience of all gardeners who grow their beds or borders of hyacinth tulips etc., and persist in watering them for a considerable part of spring and summer, for the sake of other plants which may be mixed up with the bulbs. If the period of rest is made to coincide with the dry season, then the bulb will find a congenial place to live in, will make itself at home, grows and propagates itself, and yields a wealth of flowers year after year, until some over-officious gardener meddles with this arrangement, and begins to apply his own system of superior cultivation. Then the poor bulb, unable to fly to a more ignorant and less respectable neighbourhood, pines away and succumbs."

Therefore, in the case of all spring-flowering bulbs and roots, grown in the open ground, watering should be withheld altogether, except in dry springs when they may be watered a few times, just enough to induce sufficient root activity to develop the bulb or root to its proper size, before the foliage dries up naturally for the summer resting period. This treatment should be applied for such bulbs and roots, as *Ranunculus*, *Anemone*, *Narcissi* (with the exception of *Narcissus poeticus* which flowers very late, and must be slightly watered until the flowers are over), *Hyacinths*, *Muscari*, *Early Tulips*, *Freesia*, *Scilla Clusii*, *S. campanulata*, *Nerine aurea*, *Amaryllis Belladonna*, *Lilium candidum*, *Iris hispanica*, *I. tingitana*, *I. sicula*, *I. florentina*, *I. pallida*, *I. germanica*, *I. susiana*, *I. Gatesii*, *I. atropurpurea*, *I. squalens*, *I. tectorum*, *Ixia*, *Sparaxis*, *Sternbergia lutea*, *Crocus*, *Ornithogalum*, *Allium* etc. It will be noticed that the range of bulbs and roots requiring this easy method of cultivation is very wide, and affords ample scope of selection to the most ambitious gardener.

Bulbs which habitually lose the foliage during the resting period, should never be transplanted at any time from the moment that the leaves begin to show, until they turn yellow and dry for the resting period. Such an action is sure to result

in a serious check to their vegetation, and will interfere with the development of the flowers if performed at the re-starting of vegetation, or with the due development of the bulb if performed later. It is also a mistake to transplant the bulbs and store them away for the resting period, as this practice is more or less attended with loss, shrinkage of the bulbs or roots, and favours the ravages of insect pests and fungous diseases. Bulbs should be transplanted only every second or third year, for the object of tilling and manuring the soil, and the propagation of the bulb itself by the removal and planting out of the offsets. This can be done at any time during the resting period, the bulbs being lifted up carefully with the hoe, the ground trenched and manured, and the bulbs replanted at convenient distances and at sufficient depths, but not in contact with the manure, the soil is levelled and left to itself until the first rains of autumn. A few days after the first rains, the soil can be lightly scraped or raked to get rid of the germinating weeds. No further attention is required beyond keeping the ground clean of weeds, and if the weather is too dry in spring, an occasional watering may be given to assist the plants in flower, or to promote the development of the bulb after flowering. In the second or third year some old manure may be spread over the bed or border of bulbs, soon after the first rains, after scratching off the germinating weeds, and may be lightly mixed up with the surface soil, but in good soils well prepared beforehand for the reception of bulbs, such a course is not necessary.

The soil for bulbs and roots must vary in composition and texture according to the requirements of same. Most species of *Allium*, *Gladiolus*, *Freesia*, *Ixia*, *Sparaxis*, *Narcissus*, *Anemone* and *Ranunculus* will thrive well even in a clayey soil, more or less stiff and retentive, but will do better in lighter soils, particularly in the dark loamy soils and in the red soils. It is always important that the soil should be rich in humus, that is in vegetable mould or the remains of leaves and other vegetable matter, as well as sufficiently rich in nourishing material. Sand is an excellent material to mix with the soil to give it a light texture, and should be used frequently by the bulb grower.

The rule generally followed is to plant bulbs at a depth of one to one and a half times their longest diameter; that is a *Narcissus* bulb, 6 c.m. long is planted deep enough to be covered with a layer of soil 6 to 9 c.m. in thickness. But this rule has many exceptions. Some bulbs, such as *Haemanthus*, *Lilium*, *Amaryllis Belladonna*, *Crocus*, *Sternbergia* etc., prefer to have the upper end of the bulb at about ground level. Others, such as *Griffinia*, *Urginea*, *Hippeastrum*, *Amaryllis Graveana* etc., do best if the upper third of the bulb is exposed. *Amaryllis procera*, *Brunsvigia Josephinae* and a few others, must have about two-thirds of the bulb exposed. On the other hand, the Tulips may be planted quite deeply; indeed they have a tendency to form their bulb deeper down every year. The long narrow bulbs of *Sprekelia formosissima* (the *Jacobaea Lily*) and *Nerine* or *Amaryllis aurea*, and our native *Pancreatium maritimum* often sink deep into the ground.

Many bulbs and roots such as *Ranunculi*, *Anemones*, *Hyacinths*, *Narcissi*, *Alliums*, *Freesia*, *Anomatheca*, *Iris hispanica*, *Antholyza* etc., are easily propagated by seed, but this method is of course, impossible in the case of double-flowered bulbs and roots. Moreover, the seed too often does not reproduce the variety which produced it. But in the case of bulbs which are grown in their typical form, or in a definite and stable variety, this method can be resorted to with advantage. Thus, the wild *Hyacinths*, *Muscari*, *Antholyza*, *Freesia*, Asiatic and French *Ranunculi*, the single-flowered or semi-double *Anemones* etc., and even *Hippeastrums* and Tulips, are often propagated in this way by our gardeners. The *Freesias*, *Ranunculi* and *Anemones*, generally flower in the first year from seed. In other cases the bulb or root usually will not be strong enough to flower before the second or third year. In the rare cases where the bulb habitually produces no offset, the plant must be propagated exclusively from seed. This is the case with *Brunsvigia Josephinae* from South Africa, which however usually seeds well in our gardens, and the bulbs reach flowering size when they are 6 to 8 years old. The scales of the bulb of *Lilium candidum* and of other lilies, if separated from the bulb, usually produce bulbils as small as a pea, which with due care may be grown into large, flowering bulbs. The same



principle, viz : the production of numerous minute bulbils to be afterwards grown into flowering bulbs, is adopted as an ordinary method of propagation on a large scale by the bulb-growers in Holland and elsewhere, for the commercial propagation of valuable varieties of Hyacinths etc., The disk or corm of the bulb is scooped out, down to the base of the scales, and the bulbs are disposed in trays, with the scooped side upwards, and in a few days numerous bulbils develop from the injured bases of the scales. The bulbils are shaken off, and sown in boxes, where with proper treatment they develop into small plants, each producing a small bulb, which is planted out in the nursery beds to grow and acquire full size. After removal of the first crop of bulbils from the scooped bulbs, the surface of the base of the scales is scooped further down to renew the freshly injured surface, and thus a second or third crop of bulbils is obtained, which is treated in the same manner, until the scooped bulb becomes too shrunk and exhausted to produce more bulbils. Certain plants, like *Scilla peruviana* var. *Clusii*, the bulbous species of *Oxalis*, *Freesia* etc. will produce numbers of bulbils on the roots; and others like *Achimenes*, *Tydaea*, and certain Lilies, produce bulbs or tubers at the end of root-like rhizomes.

The Tuberose is only propagated by offsets, which are produced in abundance. It is planted out in March or April, in good soil, well manured, and placed in full sunshine. Most of the offsets are removed before planting, in order that the roots of the plant may concentrate on the production of the flower-stem, which usually appears in the hottest period of summer, from July to September. The plant should not be allowed to suffer from want of water, but the pots must be well drained.

The beautiful stove bulb *Eucharis amazonica* thrives well in ordinary red soil well mixed with sand and mould, and will flower in the open air, but requires a very sheltered and warm situation, somewhat shaded off from the sun.

Bulbs which lose their foliage and have a resting period, but have perennial roots, such as *Amaryllis*, *Hippeastrum*,

*Haemanthus*, the Lilies, *Scilla peruviana*, *Urginea*, *Brunsvigia*, *Josephinae*, *Griffinia*, *Pancratium maritimum* etc., suffer more or less if transplanted and kept in store, as the living roots are apt to dry, and then active vegetation is started with difficulty. For this reason, when transplanting for the division or separation of offsets, the operation should be deferred as late as possible, that is only a short time before the epoch expected for the start of vegetation, and the transplanted bulbs may be watered once or twice, if the drought of summer has not yet been broken by a good shower of rain.

The division of clumps, or the separation of offsets, of bulbous plants with perennial roots and evergreen foliage, like *Pancratium caribaeum*, *Agapanthus umbellatus*, *Hymantophyllum*, *Clivia*, *Crinum giganteum*, *C. Makoyanum* etc., should be done in spring, as soon as warmer weather sets in. In fact, these are mostly summer and autumn flowering plants, their period of active growth being from spring until autumn, and are therefore allowed the entire growing season in which to recover and become thoroughly established. The physiological function of the bulb is the storage of nourishing material for the future development of the plant, and as these plants have perennial roots and perennial foliage, the physiological function of the bulb is reduced to a minimum, and therefore such plants have often poorly developed bulbs.

A few bulbs such as *Amaryllis procera*, *Griffinia hyacinthina*, most Lilies etc., do not tolerate well a calcareous soil, and therefore should be grown in a siliceous soil, or in a mixture of silver sand and leaf-mould, or at least the soil should be heavily charged with "terra di bosco," which is mainly siliceous. Certain summer-flowering bulbs, such as *Montbretia*, *Anomatheca juncea* etc., are apt to produce bulbs at some distance from the stem, and therefore are best grown in pots, where they remain confined together and have a better effect when in flower.

The cultivation of Hyacinths and *Narcissi* in bowls or in glasses is rather a childish pastime, and hardly deserves the gardener's attention. Some clean sand should be placed at the

bottom of the bowl or glass, and water is filled in up to the base of the bulb. Roots soon develop, and the water is changed frequently, as far as possible without disturbing the roots. Light and air are necessary to prevent the growing foliage and flower-stems from becoming drawn up and too flaccid or top-heavy. Bowls with holes round their sides are also sold for this method of cultivation, and in this case the bulbs are arranged inside, applied to the holes, of course with the bud turned outside, and the interior is packed with moss or peat, which is kept moderately moist to favour the development of the roots and the growth of the plant. Besides Hyacinths other bulbs are used for this system of cultivation, viz: Polyanthus Narcissi, Early Tulips, Crocus etc. Bulbs so treated have little chance to form new bulbs to flower next year, and are usually so exhausted that they are thrown away as soon as they have done flowering.

## THE CHRYSANTHEMUM.

THE cultivation of the Chrysanthemum for borders and beds in the flower-garden requires no particular attention, beyond replacing the old clumps every year, by means of strong suckers taken from the old clump, and a certain amount of thinning of the buds to obtain more presentable and larger blooms. Under this heading brief reference will be made only to the growing of this plant for the production of large blooms suitable for exhibition.

The best plants are raised from cuttings taken from strong woody suckers, growing at some distance from the stem of old plants, but if there is no choice, any cuttings will do, even those taken from suckers quite close to the stem, or from the stem itself. The cuttings are taken in January or early in February, the earlier cuttings being taken from the late-blooming varieties, and should consist of the top of the sucker, 6 to 10 c.m. in length. The cuttings are planted either singly in thumb-pots, or around the edge of 10 c.m. pots, 4 cuttings to each pot, in a good soil made of virgin red-earth and old leaf-mould and sand in equal parts. The soil should be pressed firmly around the cuttings, and the pots are placed in a garden-frame or at least under a pane of glass, to keep up a more even temperature and to prevent excessive evaporation. In about 3 weeks the cuttings will be rooted, and must be taken out in the open to harden for one or two weeks before repotting.

The second potting is usually done about the middle of March, and if somewhat delayed it becomes confused or identified with the third potting, which is done towards the close of April or in May, and therefore in this case the third potting becomes the second, and is anticipated by two or three weeks. For the second potting the pots should be 10 c.m. in diameter, and for the third potting pots 15 c.m. in diameter are required; in both cases the plants being shifted

from one pot into the other with as little disturbance of the roots as possible. The pots should be well crocked to ensure perfect drainage, and the soil should consist of 4 parts virgin red-earth, 2 parts old leaf-mould, 2 parts sand and 2 parts of old manure, well mixed together, or better passed through a coarse sieve. The soil should be pressed down moderately around the roots, and the plants watered and shaded off for a day or two. Watering should be done very carefully, and at first sparingly, but the plants should not be allowed to flag for want of water. On the other hand, excessive watering of too young plants is sure to throw them into a sickly yellowish condition, from which it will be impossible to induce them to recover in time to produce useful blooms.

The pots for the final potting should be 20 to 25 c.m. in diameter, and to these pots the plants should be transferred towards the end of May or in June. Soil of the same composition as above mentioned may be used, and in shifting the plants their roots should be interfered with as little as possible, leaving the ball of earth untouched and merely removing the crocks. Watering should be done very sparingly until the roots are again in full activity. The plants should be placed in full sunshine, and should be syringed with a weak watery solution (1 in 100 or 200) of sulphide of potash to keep down fungous diseases, and should Aphids make their appearance syringing with some insecticide such as katakilla, diluted tobacco-juice etc., or dusting with precipitated sulphur containing nicotine (Schloesing's) will keep the plants free from these pests.

In April, that is before the third potting, or about 2 or 3 weeks before the final potting, the plants are stopped to about 10 c.m. from the soil, in order to ensure a break, with the production of side branches, which in their turn will produce the flower-bud. This is a general rule to be adopted in most cases, but there are many varieties which would prefer a different treatment. Thus, in some instances the plant must be stopped earlier, that is in March or April or at the second potting, and there are instances in which there will be a natural break without any necessity of topping. There are

also varieties which must be stopped twice to give the best results. In this matter, the grower of course must act in accordance with the directions given by the raiser or seller of those particular varieties. However it is important not to overdo what is directed, and especially it is advisable not to render cultivation of the *Chrysanthemum* too abstruse or too exacting on the part of the gardener or amateur, otherwise one may feel discouraged to take up or to continue the cultivation of this very interesting flower.

After the final potting the plants will soon begin to make vigorous growth and to throw up suckers. These should all be removed as soon as they appear, without injuring the roots, so that the roots may concentrate all their energy on the development of the branches and the flower-buds. After topping the plant, two to five or more branches will develop from the stem, and these should be retained as flowering branches, but as a rule unless the plant is exceptionally strong the retention of more than three branches will result in a reduction of the size of the exhibition flower, in plants grown in pots. All other side twigs developing on the stem or branches should be scrupulously removed.

The first crown buds always produce the largest flowers, though not always the fullest. The second crown buds produce large flowers of exhibition size, quite full, and well-coloured. Terminal buds produce smaller flowers, fairly full and very well coloured. To this rule there are few exceptions. Some *Chrysanthemums* develop best on the first crown, and a few prefer the terminal, but most of them yield good results on the second or late crown. The first crown is the bud which develops at the top of the original branches just before the natural break into secondary branches, and if left unheeded it will fail to develop, the secondary branches developing in its stead. The second or late crown is formed at the end of the secondary branches, and like the first crown buds often fails to develop, if the side twigs bearing the terminal bud along with other side buds are allowed to grow and develop unchecked. The first crown, and to a less degree, the second crown bud, are furnished with long pointed bracts, which give

it originally a conical appearance. The terminal bud and other side buds are always round or flattered from the start, when quite young and newly formed. Moreover the first crown bud, and also the second, are more liable to the ravages of insects than later buds, possibly before they are fewer and take a longer time to develop.

When all the buds are selected, all the others on the same branch should be removed, in order that the activity of the branch may concentrate on the selected bud. This removal of buds is best done in the morning, when the tissues are brittle and more easily broken off, and the buds are best removed a few at a time, that is every 2 or 3 days, in order that the injury to the tissues may not cause any check to the development of the selected bud. New side twigs and buds continue to appear, and until the selected buds are already in bloom, must be removed periodically, so as not to draw uselessly upon the energy and resources of the plant.

As soon as the flowering branches are tall enough, each should be secured to a stick, keeping the bud well above the stick so as not to interfere with its regular growth; and when the flowers begin to bloom it is advisable to remove the pots to a sunny place sheltered from wind, and also sheltered from rain which would injure the flower or cause it to rot or become mouldy.

Chrysanthemums grown for exhibition must be very well fed in order to produce blooms of the required size and quality, and in this connection the use of fish-manure, or of chemical fertilisers is always recommendable and often indispensable. Some bone-meal may be mixed with soil; or repeated small doses of guano, which is principally a phosphatic manure, may be given. As soon as the buds are selected the plant may have a dose of nitrate of soda to push on the development of the petals to their full size, and the dose may be repeated once or twice at intervals of 2 or 3 weeks.

Chrysanthemums grown in the open ground for exhibition purposes, that is with the same care as that bestowed on

plants in pots, generally speaking produce larger and finer blooms. For this object, the rooted cuttings are planted out in April, at a distance of 40 to 50 c.m. apart, on land well trenched and heavily manured. When the plants become well established and commence to make good growth they are watered regularly every second or third day, with an occasional application of liquid manure, and later on when the buds are selected, a good dose of nitrate of soda is likewise given. The same care is taken as regards topping, selection of buds, propping etc. In the open ground strong plants will often bear six to eight large blooms, but it is better to limit the production to only three or four branches, each bearing one bloom, if first class flowers are required.

The cultivation of Chrysanthemums in a bushy form, bearing from 12 to 24 flowers, whether in large pots or in the open ground, requires some care as to the selection of the plants. Those should be the earliest obtainable, and if possible reserved from unflowered suckers which had developed late in the preceding year. They are topped early in the season, at about 15 c.m. above the soil, the upper branch which develops is again trained as leader, and the others are trained all round on a wire support. The leader is topped again when it has reached about 15 c.m. in length, and the resulting leader and side branches dealt with in a similar manner, repeating the operation once more if necessary, and topping also the side branches, until about mid-August, when the resulting tops must of course be allowed to form the bud. In this case, however, the terminal buds are usually selected, and in fact it is not possible to select the first crown, and rarely the second crown buds.



## THE CARNATION.

**T**HE Carnation (*Dianthus Caryophyllus* L.) is a native of Southern Europe, and grows on granitic and siliceous hills, as well as on calcareous soils. Therefore it should agree well with our soil and climate. Indeed the Carnation thrives very well in our retentive virgin red soils, well mixed with old rotted manure, and under proper treatment success is assured. On the other hand, the Pink (*Dianthus plumarius* L.) is less accomodating, as regards both soil and climate, and is often disappointing, although it also can be grown with a fair measure of success in favoured localities.

The older classifications of Carnations and Picotees have been more or less affected by the recent developments. At present from the gardener's point of view these plants may be classed as follows:

*Malmaison Carnations.* Mostly of dense bushy habit, with broad foliage. Flowers usually solitary, or with one or two small buds at the side, with a short thick calyx, more or less burst on one or more sides. Petals self-coloured or mostly so, fringed with small teeth, irregular in appearance. The Malmaisons flower only once a year, in May-June, but occasionally a few blooms are produced in autumn. The plant has a sturdy habit, but is in reality more delicate than that of other classes. The flowers do not often produce seed, and in any case propagation by seed is rather difficult and inadvisable.

*American Carnations.* A class of recent origin, but now already very extensive and deservedly popular. The plants have a sturdy habit of growth, sometimes bushy, sometimes straggling, with large broad foliage. Flowers on long stiff stems, mostly erect, often solitary or with few side buds, very large, equalling or even surpassing the Malmaisons, with a calyx of medium length, often burst on one side, with large self-coloured petals, toothed or slightly toothed or just cor-

roded at the margin, and more regular than those of the Malmaisons. Often only slightly scented. They are of as hardy constitution, and almost as free-flowering, as any other class of Carnations. They seed freely, and very good seedlings are often obtained. The list of good American Carnations is now a long one, and includes a great range of colours. The varieties having a straggling habit of growth are often called American Tree-Carnations.

*Tree-Carnations.* These present also a considerable range of colour, self-coloured, or variously spotted, flaked or variegated. They have a calyx of the usual size, which may or may not burst, and the petals are usually slightly toothed or just corroded or almost entire. The characteristic of this class is the habit, which is always tall and straggling, often stretching to about one metre in old plants, rarely more compact and almost erect. They are in flower practically all the year, often flowering in autumn almost as abundantly as in spring. They are specially desirable for balconies, terraces and rockeries, and are very hardy and long-lived.

*Schiavoni Carnations.* They are Tree-Carnations of Italian origin, usually with more slender foliage, and have the same habit of growth and are just as hardy and floriferous. However they more frequently burst the calyx, and the petals are less substantial and more deeply fringed and toothed.

The typical *Carnations of Collectionists* are often quite as large as the largest Americans and Malmaisons, but are usually not so double and much more regular, with even and generally entire petals, with a much more extensive range of colours. They may be *self-coloured*, that is of the same colour throughout, or *Flakes*, that is splashed or variegated with another colour, or *Bizarres*, dotted or slightly splashed with two colours besides the ground colour; the *Painted Ladies* are usually rose to pink or red on the upper surface of the petal, and white or whitish on the lower surface. The *Picotees*, often considered as a class by themselves, are Carnations of very regular form, usually not too double, with very entire and even petals, white or yellow, evenly margined with a thin

or thick border of light pink to dark red. Their only fault is that they are not so free-flowering as other sorts, usually flowering only in May-July.

The *Carnations of Florists* include several well known types or races, which are really perennial, but are mostly grown as annuals or half-biennials. The more important are the Queen Marguerite Carnations and the Grenadin Carnations. The first named, especially the improved race as now sold, produce a large percentage of double or very double flowers, often of large size, in a great range of colours, with petals more or less irregular and fringed or toothed. Many varieties of Marguerite Carnations come almost true from seed, and are therefore useful in the formation of beds or borders of the same shade of colour. The Grenadin Carnations are equally floriferous but the flowers are usually smaller, though almost always double, and more deeply fringed or toothed. Their colour is a more or less lively pink or scarlet to a deep grenate-red or crimson, with a strong perfume.

The cultivation of Carnations may be summed up briefly as follows: good virgin red-earth, well mixed with old manure, and an open situation fully exposed to the sun and air. The Malmaison Carnations are liable to suffer and become chlorotic in our red earth, and for them it is advisable to use a soil made of virgin red-earth and about one-half the volume of silver sand or "terra di bosco".

The virgin red-earth should be of a dark red and retentive quality, and it is advisable to mix it with about one third of its volume of old manure, preferably pig's manure; to water it properly and then stir it up repeatedly before use. The action of pig's manure on the growth of carnations is extraordinary. Under its influence the plants soon acquire great vigour of growth and great resistance to fungous diseases. The young plants may be potted into 10 c.m. pots, and then transferred into 18 to 25 c.m. pots, well in time to re-establish themselves and flower well the same year. The pots should be placed in an open and sunny situation, well-exposed to currents of air, but of course they may be shifted to more sheltered or even half-shaded localities when the

flowers are well developed, to make them last longer. After flowering, the pots should be taken back to their former exposed situation. In mid-summer the plants may be placed along a wall where they may have the sun upon them only in the morning or in the afternoon, or the pots may be placed within larger pots in order to prevent the baking heat of the sun from injuring the roots in close contact with the sides of the pot.

In the autumn the old plants may have the soil changed, or at least a liberal dressing of manure given to start good growth before winter. When the plants begin to push up their flowering stems in spring, one application of liquid manure or nitrate of soda may be given, to improve the size of the bloom, and the stem may be tied up separately to sticks or bamboos, at the same time reducing the number of side buds, to improve the terminals.

Carnations are propagated by layers or cuttings. The layers are made soon after flowering, and are separated from the mother-plant in September-October, and after a few days are potted off separately. It is usual to make a flute-like cut on the stem of the layer, just before a node so as to induce the early formation of callus and roots at that node, which of course should be selected so as to be well beneath the soil when layered. Cuttings or pipings can be taken at any time from October to February, but it is always better to operate early, in October-November, in order to have strong flowering plants by next April. The cuttings are best selected from the stout side shoots, with nodes closely set, with some old wood at the base, but for want of better material any shoots ending in a growing top are good for propagation. The lower leaves are removed along with their sheaths surrounding the nodes, and the nodes and stem are laid bare. That part of the stem is then lightly scraped to induce a quick formation of callus and roots, or the cut end of the stem just below a node may be sliced for about half a centimetre with a penknife, always with the same object in view. The other leaves may be shortened or cut back, or left as they are, and the pipings are inserted for 2 to 4 c.m. in the soil, which is watered before,

and again after, inserting the pipings. The soil should be good earth mixed with well-rotted manure which has ceased to be fermentable, and the shallow pot or pan in which the cuttings are inserted should be placed in a sunny situation, but rather sheltered. In 4 to 6 weeks the cuttings will be well rooted, and already making some growth; and then they may be transferred cautiously, with a ball of earth, to their pots. Many nurserymen used to grow cuttings of carnations in empty egg-shells pierced at the bottom and placed close together in a frame under glass. In this case, of course, the transfer of the rooted plants to their pots is a more simple matter. In autumn the Carnations, whether in pots or in the open ground, should be cleaned of dry leaves and shoots, properly manured, and with good treatment induced to start growth before winter. This early autumn treatment is specially advisable in the case of Tree-Carnations and American Carnations which are expected to yield a crop of flowers in autumn and winter. Carnations grown in the open ground should be dealt with very carefully throughout the summer. Summer annuals planted among them are sure to choke them out of existence, and watering should be regulated so as not to cause root-rot which is the great danger to Carnations during summer. Watering is best done in the afternoon, when required, in order not to have an overheated moist or muddy soil in close contact with the roots during the day.

The sowing of Queen Marguerite Carnations and of other Florists' Carnations may be done in September-October, and the seedlings are planted out in the border or flower-bed in December or January, in order to flower in spring. If sown in spring, even if allowed to remain half-starved in the seed-bed for a long time, they generally become too old for planting out in the following autumn, but those which survive become quite large plants by the time that they flower in spring. It is important to select the seed from the best plants in order to keep up the quality of the strain. Specially good plants may be propagated by layers or pipings in the usual manner.

Propagation by seed is also recommended in the case of other Carnations, particularly of American Carnations and of the more refined Carnations and Picotees of collectionists,

In this manner new and valuable varieties are often obtained, which of course will present a special interest to the raiser. The seed should be selected invariably from the best plants, and is best sown in September-October. In this connection it may be stated that the stronger seedlings often turn out either single or of little value, but the weaker seedlings, that is those which are left in the pan after picking off the stronger ones, are generally double varieties worth keeping.

Like other plants, the Carnation is subject to many diseases, the following being the more important.

*Uromyces caryophyllinus* is the fungus causing Carnation-rust, which it often sufficiently severe to kill the plants. It develops as brown spots on both surfaces of the leaves, which soon curl and die. It is kept in check by sprayings with Bordeaux-mixture.

*Heterosporium echinulatum* is another fungus causing the so-called Fairy-ring on the leaves of Carnations; the leaves becoming bleached in patches and on the affected part develop broken circles of blackish dots which are the fructifications of the fungus. Diseased leaves should be picked off and burned, and the neighbouring plants sprayed with a weak watery solution of potassium permanganate.

*Septoria dianthi* is another fungus causing a bleaching of parts of the leaf, which become of a reddish colour and extend all along the leaf, which soon dies off. Spraying with Potassium sulphide (weak watery solution) is recommended against this disease.

*Puccinia arenariae*, common to many wild plants, attacks also the Carnation, forming blackish spots arranged in irregular circles on the leaves and stems. It is kept in check by Bordeaux-mixture.

Another fungus-pest is *Macroporium nobile*, which develops as numerous small blackish spots on both surfaces of the leaves and on the stems, more or less irregularly scattered.

Pick all diseased leaves and burn them, and spray with a weak solution of potassium sulphide.

The Eel-worm (*Tylenchus devastatrix*) is often the cause of the formation of nodules on the roots, with destruction of the rootlets. An excellent method of dealing with this pest, which generally is in evidence when the plants are over-watered, is to allow the soil to get comparatively dry, and then to drench it with a weak solution of common green vitriol (ferrous sulphate). Against the ravages of the two beetles *Oxythorea funesta* and *Epicometis squalida*, which destroy the flowers, there is no remedy except to pick up the beetles and destroy them.

## THE CYCLAMEN.

THE principal species of Cyclamen under cultivation are : *Cyclamen Coum*, a native of Greece, the Balkans, and Asia Minor, *C. europaeum*, native of Central and Southern Europe, *C. neapolitanum* or *hederaefolium*, native of South Europe, and *C. persicum* or rather *C. latifolium*, native of Greece, and not of Persia as its name implies.

*Cyclamen neapolitanum*, and less frequently *C. europaeum*, are cultivated in gardens either as a pot plant or for hanging baskets etc., or for naturalising under trees. It is very floriferous, producing its flesh-coloured or pink flowers with a purplish throat, in autumn, before the appearance of the leaves, and thrives well in ordinary red soil, provided that it has a sandy or loose texture, but of course grows best in a mixture of mould and sand. Like all other species of Cyclamen, it prefers a shaded or half-shaded situation, particularly in the neighbourhood of trees, or in a cool and shaded country-yard. It is usually propagated by seed, which may be sown at any time from September to March, in leaf-mould. The root or corm flowers when about one year old, and in time may grow to the size of a thick cake, 20 c.m. in diameter. Like *C. Coum*, it is also ornamental on account of the beautiful shape and white markings of the leaves. In upper Italy the corms of *C. neapolitanum* are made use of for hanging baskets, the corms being placed around the inner sides of a basket of loose wicker-work, with the lower or rooting surface directed inwards, and the whole space is firmly packed with wet moss. This is done in September, when the corms are still dormant, and by keeping the moss still moist, the corms soon start into flower, pushing the flower-buds all round the basket, through the wide meshes of the wicker-work.

*Cyclamen Coum* is another species with very finely shaped and variegated foliage, particularly in the form *ibericum*. It is not so floriferous as *C. neapolitanum*, but the flowers are



larger, white or pinkish-white, with purple spots on the throat. This species deserves to be more grown, and its flowers are produced in the winter months, from January to March. The corm is small, and is raised by seed sown in autumn. It should be remembered that the corms of all species of *Cyclamen* are poisonous.

However, *Cyclamen persicum* is the species very deservedly popular with most gardeners, on account of its large flowers, and of the great variety of their colouring and shape. The term *Cyclamen*, used without further definition, is generally understood by gardeners to apply to this important species. For the conservatory or the cool glasshouse or for the open garden in sheltered and somewhat shaded situations, it is difficult to hit upon a pot plant more desirable than the *Cyclamen*, with its wealth of flowers, ranging in colour from pure white to salmon, scarlet and deep crimson, produced more or less abundantly in winter and early spring. This *Cyclamen* is best grown in a mixture of silver sand and old leaf-mould, with the addition of some old manure, but occasionally it thrives admirably in ordinary red soil, of a loose or sandy texture, provided that there is no deficiency of humus or organic remains. In fact, it is known to flourish at Birchircara, in ordinary red garden-soil, as a border or bedding plant, and also as a pot-plant, with very little attention.

The seed is best sown in shallow pans, in a mixture of leaf-mould and sand, at any time from September to April. Germination takes place in ten days to three weeks, and the young seedlings are potted off singly in very small pots filed with the same mixture, or 3 to 6 together in larger pots, where they may be allowed to grow for about one year. The resting period is usually short, being limited mostly to June, July and August, when the corms may be planted off singly in pots 15 c.m. in diam. where most of the plants will flower in the course of the following season. By the 3rd or 4th year the corms will reach their full size, and when in bloom are very desirable pot-plants for conservatories and well-lighted rooms. *Cyclamens* delight in a rather moist soil, but any stagnant moisture, usually shown by the growth of mosses and deep green filamentous Algae on the surface of the soil, often causes the corm to

rot off. However, even during the summer resting period, it is advisable not to allow the soil to become too dry for long periods, and the corms should be well packed in moistened moss or peat, if it is required to store them or to transport them to considerable distances.

Instead of the old *Cyclamen persicum*, a large-flowered and vigorous strain called *giganteum*, is that now generally cultivated. In the typical *Cyclamen latifolium* there are the dark pink or purplish spots on the throat of the flower, but we have also many self-coloured varieties of large size and great beauty, ranging from pure white to flesh-pink or rose, dark pink, salmon, scarlet, crimson and dark crimson. There are also varieties with about ten petals instead of five, as well as varieties quite double or full, or with a large number of smaller inner petals. A large-flowered strain, with sweet-scented flowers (*odoratum*), is now also frequently grown.

The strange-shaped *Papilion* strain is remarkable for the curiously waved and crisp edges of the petals, usually bordered of a deeper colour, and in the strain known by the name of *Rokoko* or *fimbriata-splendens*, the flowers are mostly star-shaped and flat, with petals deeply fringed or cut. But the typical *giganteum* strain, as now supplied by the growers in Holland etc., is always more floriferous, and therefore more desirable, and quite as effective.

## THE TENDER ANNUALS.

**T**HIS heading is a misnomer and misleading. But in our Flower Shows it is meant to include such plants as *Cineraria* and *Primula*, which strictly speaking are not annuals, and includes also the *Calceolarias* both herbaceous and shrubby, these last being in reality perennial, *Viola tricolor*, *Lobelia Erinus*, *Schizanthus wisetonensis*, *S. trimaculatus*, *Mimulus moschatus* etc., which are not always *tender* and not always annual. But if not accurate, the heading is convenient, and leaving out the other species for the sake of brevity, we shall limit our attention to a) the Herbaceous *Calceolaria*, b) the *Cineraria*, and c) the Chinese Primrose.

The *Calceolaria* must be grown throughout in leaf-mould, and here the best results are obtained by using fresh chestnut, leaf mould. The seed is sown very lightly on the moist surface of the mould well pressed down in a pan or shallow pot covered with a pane of glass and kept in a frame or greenhouse, in a warm place, but away from direct sunshine. The sowing is made preferably early in September or not later than the end of that month, in order that the plants may have full time to grow before flowering. It is better to make two sowings, one in the first week of September or towards the close of August, and the second about two weeks afterwards, in order to secure a supply of seedlings in case of accident to the first batch. The pan is watered by placing in a larger pan with water, as any attempt to spray overhead is sure to result in derangement and destruction of the minute seeds and seedlings. When sufficiently large to handle, the seedlings are pricked off with the point of a penknife, and planted separately in 5 c. m. pots well packed with fresh chestnut leaf-mould, and placed in a garden frame, quite close to the glass, and well shaded off from the sun. The *Calceolaria* is very impatient of direct sunshine, and as soon as the plants are established, watering should be done very carefully, if possible without wetting the leaves, and just sufficient for the plants. If the young plants are allowed to

become chlorotic through the use of old leaf-mould, or through injudicious watering, or if they flag too much as the result of direct sunshine, recovery is often difficult. In January the plants may be shifted to 15 to 18 c.m. pots, filled with fresh chestnut leaf-mould, well packed, with as little disturbance of the roots as possible, and continual attention is paid to watering and shading the plants in their frames, opening up the frame partly for a few hours every day, to give ventilation. In March and April, or earlier if there is danger of excessive moisture, which is sure to induce chlorosis and mouldiness, it is better to keep the frames always half-opened, at least during the day. When the plants begin to flower, towards the close of April or early in May, the gardener will consider himself amply repaid for his trouble by the display of the gorgeous colours of the large curiously shaped flowers. Later on, if he wants to save seeds from his plants, he must take off the cover of the frame, in order that the fertilisation of the flowers may be secured by the visits of pronubal insects and by the more direct action of the sun.

The *Cineraria* (*Senecio cruentus*), in its vast variety of colours and shape, is always an attractive plant, and for bedding purposes it has few rivals. In spring it is a feature in most well-kept flower gardens, and its prolonged period of bloom, along with its early flowering is an additional advantage. There are several well known strains in cultivation, such as the tall, and the dwarf large-flowering varieties, the stellate or star-shaped strain, the so-called Cactus strain, the double-flowered strain etc. For cultivation in pots as exhibition plants, the dwarf large-flowered strain is preferable, but for the flower bed the ordinary type with middling single flowers, in the greatest profusion of shades of colour, is always more satisfactory, being less exacting and having also a stronger habit of growth.

The *Cineraria* is best sown early in the season. The first sowing should be made in the last two weeks of August, and subsequent sowings may follow in September. The soil may consist of old leaf-mould in a shallow pot or pan, covered with a pane of glass, and placed in a cool and shaded situation. To

raise plants for the flower beds, the seed may be sown in a bed, heavily charged with old leaf-mould, at least to a depth of 5 c.m., and properly manured with old sifted manure. The bed is made on a raised base, so that any excess of water or rain is easily drained off and the site should be selected in a cool and shaded situation, generally in the shade of trees, and arrangements must be made to keep off the rain by a cover of canvas or mat disposed obliquely. The seed is strewn lightly, and only slightly covered, the seed-bed or pan being watered by means of a fine rose, so as not to cause any disturbance of the soil. Watering is best done very lightly, but twice a day, morning and evening, until the seedlings begin to form the first leaf. The bed should be well protected from direct sunshine, and also from rain, as a heavy shower may destroy the young seedlings. As soon as the seedlings have one or two leaves, or are large enough to handle, they may be pricked off with a penknife, and potted singly in small pots, in a soil heavily charged with old mould; but if they are meant for the flower bed, they may be planted in rows, about 5 c.m. apart, on a raised bed in the shade of trees, to acquire strength, and after a few weeks, that is in November or early in December, they may be transferred with a small ball of earth to their final destination in the flower bed.

This bed or border should be heavily charged with old leaf-mould, which is easily obtained or prepared by fermenting the foliage sweepings and refuse of the garden in a corner specially allotted for the purpose, and a liberal supply of old manure is also added to the soil just before planting. The further attentions required consist in watering lightly but frequently in dry weather, in keeping the soil well tilled and free from weeds, and in applying some liquid manure in January or February, when the plants have become strong enough to bear it. It is necessary to keep the soil well moist during the flowering, in order to prolong the blooming period as much as possible.

For the cultivation of the *Cineraria* in pots, it is advisable to make use of a compost made of equal parts of mould and good red soil, with some sand, bonemeal and much old manure. This compost should be prepared some time before use, well

fermented and kept somewhat moist. The pots should be at least 20 c.m. in diam.; and the shifting of the plants from their small pot should not be delayed later than the first or second week of December. The pots are placed in an airy place, in the shade of trees, and it is always advisable to protect them from heavy rains and especially from hail which destroys the tender foliage. The plants are regularly watered, and are sprayed once a day with a syringe or fine rose. The presence of *Aphis* is kept down by the use of *katakilla* or of tobacco powder.

*Primula malachoides* and *P. obconica* are often grown in ordinary garden soil, but they do better when grown in leaf-mould. *Primula chinensis* (the Chinese Primrose) requires leaf-mould, and as a rule fails to thrive well in a compost containing red earth in any proportion. Other Primroses often grown, are *Primula japonica* and *P. farinacea*. The Polyanthus Primrose is often cultivated as an ordinary garden annual or perennial for shaded borders or beds, and is hardly to be considered as a tender annual.

The Chinese Primrose is deservedly the more popular species, and at least here it is grown exclusively as a greenhouse plant. The seed is sown as early as July or August, in shallow pans, in old leaf-mould mixed with sand, and is covered with a pane of glass until the seedlings commence to show the first leaf. The seedlings are potted off singly in September or early in October. The pots should be about 15 c.m. in diam., with chestnut leaf-mould, or a mixture of mould and sand, including powdered rotten carob wood, with a good supply of well fermented manure. However, fresh chestnut leaf-mould, mixed with sand and old manure, is always preferable. The first trusses of flowers begin to show in December, and the plants are usually in full bloom in January and February.

The foliage of *Primula obconica*, and to a less degree that *P. chinensis* and *P. malachoides*, coming in contact with the skin, may cause a painful and troublesome eruption, which it is well to avoid by besmearing the hands with olive-oil before handling these plants, or by the more simple method of

wearing gloves. *Primula malachoides* is very free flowering, and so also is *P. obconica*, with its flowers varying in colour from white to deep pink or purplish, but the Chinese Primrose is very justly preferred by amateurs, and is indeed an admirable ornament of the greenhouse or conservatory during the winter months and in early spring. However, in order to secure good seeds of *P. chinensis* it is necessary to take the plants out in the open, in March-April, so that the last flowers at least, may be fertilized by the action of insects as well as by the action of a freer atmosphere and of the sun.

## PLANTS FOR INDOOR DECORATION.

**T**HE selection of plants and their cultivation for indoor decoration is an important matter for the gardener.

Besides the various species of Ferns and other foliage or flowering greenhouse plants, many other foliage plants and flowering plants in bloom are taken into the house for the sake of ornament, on particular occasions, or also as a matter of ordinary or daily practice. But of course these plants are not really indoor plants, and if kept inside continuously for a few days will suffer more or less severely, or may succumb. Many plants, such as Bamboos, *Euonymus* etc. will keep well with proper attention, for long stretches in an open and airy situation, such as a backyard, a terrace etc., but will soon shed their foliage if kept indoors for more than a few days. Therefore, under this heading reference will be made only to such plants as will keep well indoors, even in badly lighted and close localities, for considerable periods, if they are allowed alternate periods in the open air under a trellis or in the shade of trees, to recuperate.

Palms offer an excellent selection of plants for indoor decoration, the hardiest and best being the following: *Kentia* (*Howea*) *Forsteriana*, *K. Belmoreana*, *K. Canterburyana*, *Chamaedorea elegans*, *Livistona chinensis* (*Latania borbonica*), *L. australis*, *L. rotundifolia*, *Corypha Gebanga*, *Corypha* (*Sabal*) *umbraculifera*, *Chamaerops humilis* and its varieties, *Trachycarpus excelsus*, *Phoenix dactylifera*, *Ph. canariensis*, *Ph. pumila*, *Ph. reclinata*, *Ph. leonensis*, *Ph. rupicola*, *Ph. Roebelenii*, *Thrinax elegans*, *Th. argentea*, *Rhapis flabelliformis*. Species of *Washingtonia*, *Erythraea*, *Brahea*, *Pritchardia*, and even *Cocos*, as a rule do not tolerate well an indoor atmosphere and the lack of sunshine. *Cycas revoluta* resists for a long time and is deservedly popular. Other species of *Cycas*, viz: *C. Rumphii*, *C. circinalis*, are equally resistant. *Ficus elastica* var: *macrophylla*, *F. Benjamina*, *F. citrifolia* and other species of *Ficus* are also much in use, but the first named is most



resistant to the dry atmosphere of rooms, its variegated-leaved form being much in request. *Aspidistra elatior* and its variegated-leaved form, *Asparagus Sprengeri*, *A. plumosus* *A. Bonplandi* etc., are also much in vogue. *Aspidistra* is propagated by division of the rootstock in early spring, and the variegated-leaved and dotted forms are liable to lose their white and yellow flakes or dots unless grown in a soil containing a fair proportion of silver sand or "terra di bosco." The species of *Asparagus* are usually propagated by seed, but *A. plumosus* prefers a soil with silver sand. The division of old clumps can be done at the close of winter.

Certain species of *Begonia*, such as *B. gigantea*, *B. plataniifolia*, *B. riciniifolia*, *B. discolor*, *B. palmata*, *B. metallica*, *B. argyrostigma*, *B. fuchsoides*, *B. arborescens* etc. do fairly well in ordinary garden soil, and keep fairly well indoors but in a well lighted situation such as a verandah or loggia or staircase landing, or a balcony in a sheltered situation, but not in direct sunshine. Like all indoor plants, they are liable to have their foliage disfigured with dust and the officious maid will try to wipe off the dust with a wet cloth. This practice must result in injury to the foliage and it is much better to take the plants in the open and drench them thoroughly with water from the rose of the watering can. *Tradescantia zebrina*, *T. decora*, *T. discolor*, *Commelina Sellowiana*, *C. prostrata* and other species, usually give satisfactory results for indoor decoration grown in hanging baskets or in wall troughs. *Saxifraga sarmantosa* is useful for small hanging baskets, but does best in a window or well-lighted place. *Saxifraga oblongifolia* or *S. gigantea*, with its large deep green foliage is desirable for windows and rooms, and its bunches of lovely pink flowers are welcome in winter.

Other plants such as *Dianella coerulea*, *D. divaricata*, *D. nemorosa* and other species, stand well the close atmosphere of rooms during the greater part of the year, and their graceful deep green grass-like foliage is very ornamental. They do well in ordinary garden soil, and are propagated by seed or by division of old clumps. They are resistant to drought, and are little affected by the dry indoor air. The very pretty

*Isolepis gracilis* with its hair-like light green stems terminated by the inflorescence in the shape of a whitish nodule, is similarly propagated by division of the clump, and so is also *Cyperus alternifolius* and its variety *C. flabelliformis* which are very decorative as pot plants. They are in reality bog plants, but thrive very well with the pot placed in a saucer of water.

A few years ago, *Pancratium caribaeum* was very popular for indoor decoration, and indeed it keeps very well for long periods even in badly lighted rooms. Its long shining green foliage is very ornamental, and the pure white sweet-scented flowers are produced at the close of summer. It is propagated by offsets, taken off in spring or summer.

The *Dracaenas* are all valuable for indoor decoration, but the coloured-leaved sorts usually do not stand well the dry indoor atmosphere, and are also particularly liable to suffer in winter being susceptible to cold weather. However, such species as *D. Bruanti*, *D. ferrea*, and especially *D. indivisa* (*Cordyline indivisa*) and the prettily variegated *D. Doucetti* do very well for long stretches, and only require now and then to be taken out in the open, in a cool and shaded locality, to recuperate. *D. indivisa* is easily propagated by seed, which is produced profusely by old specimens planted out in the garden. The others are propagated by offshoots, layering the stem when it becomes too leggy, and by cuttings of the stem.

*Aralia* (*Fatsia*) *japonica*, and especially its variety *Sieboldi*, with larger foliage of a shining deep green colour, is often grown for indoor decoration in well lighted rooms. It is propagated chiefly by seed, and does well in ordinary garden soil. *Sciadophyllum digitatum* and to a less degree *Aralia* (*Fatsia*) *papyrifera* are also grown in pots for house decoration in ordinary garden soil. The first is propagated by cuttings, the second by offshoots or suckers.

*Ruscus hypophyllum*, the so-called *Belladonna*, is very commonly grown for indoor decoration, being able to stand the dry atmosphere and the want of light for very long periods, and requiring very little attention beyond watering and an

occasional manuring. It is propagated by division of old clumps in winter or early spring. *Ruscus aculeatus* is less frequently grown, on account of its spinescent foliage or cladodes.

*Pothos aurea*, usually known to gardeners as *Philodendron Lindeni*, is a creeper of the *Arum* family, with heart shaped pointed leaves of a shining green, and of variable size, heavily splashed white and yellow. It is very ornamental and does well in shaded situations, closed balconies, yards, and even in the room trailed on bamboos. It is propagated by layers or cuttings. *Philodendron pectinatum*, *Ph. Imbe*, and other species are less frequent, but are really good foliage plants. *Monstera deliciosa*, commonly called *Philodendron pertusum*, has magnificent foliage of a dark shining green, deeply cut and more or less perforated with oval or round holes. Its large flowers are produced at the close of summer, and the fruit matures in about twelve months. It is sweet and aromatic but often contains spicules under the rind which may impart an itching sensation to the tongue and lips. The plant is easily propagated by cuttings of the stem, in spring and summer. It grows very well in ordinary garden soil, thrives anywhere, and may be taken indoors for long periods from autumn to spring. *Monstera dilacerata* or *Rhaphidophora dilacerata* is another Aroid, with the same habit as *M. deliciosa*, but much smaller in size and far less ornamental. It is sometimes grown for indoor decoration, requiring the same treatment as the former species.

It should be remembered that all plants require more or less the open air and a fair allowance of light. Their cultivation indoors is always an unnatural process, and therefore they require a great deal of attention in order that they may retain all their qualities which make them desirable for house decoration. They must be grown in pots of the smallest size, compatibly with the size of the plant, in order not to occupy too much room, and this is another cause of inconvenience and ill health to the plant itself, the roots becoming pot-bound, and often partly rotting off. But except when the plant is pot-bound and therefore able to take up a comparatively large quantity of water in proportion to the size of the pot, watering

should be done very carefully, as any excessive watering frequently repeated is sure to result in a cloddy and sour condition of the soil, which becomes infested with earth-worms, to the detriment of the root-system of the plant. The best way to water the plants is to remove them out in the open, in a sunny and sheltered situation, and spray them abundantly once or twice, so as to wash down the dust from the foliage and then to take them again indoors, as soon as the water has dried off the foliage. However this method is not always practicable, and in that case the gardener must content himself with placing a saucer under each pot to receive any excess of water and prevent it from running about, and to syringe the plants lightly just to refresh the foliage. The soil of pots kept indoors, out of direct sunshine is apt to retain a moist appearance even when it becomes comparatively dry, and as most of the plants above mentioned have stiff foliage which does not visibly flag when the soil is dry, there is danger that the plants may actually die for want of water, before the gardener is aware that anything is the matter. Hence the plants should be visited daily or periodically, with a small hoe in hand to test the condition of the soil, and water given as required.

Indoor plants perhaps require more attention as regards manuring, than other plants. For obvious reasons organic manures should not be given to the plants during the period when they are indoors. If they require manuring some wood ashes may be given in spoonful doses, with or without the addition of superphosphates. But it is always better to reserve the application of fertilisers to the period when the plants are taken out in the open to recuperate. Then they may have the usual good dressing of well-rotted manure, with the addition of wood-ashes and fish-manure or superphosphates or bone-meal, which will assist the plants to resume their wonted vigour. After some time a small dose of nitrate of soda may be given, to be repeated just before the plants are again taken inside.

It is essential to have at least two sets of plants for indoor decoration, one set to be kept in a shaded and sheltered place,

or in a greenhouse, while the other is doing duty indoors. The sets may be changed every one or two weeks, and this is a much better practice than to keep them inside for long stretches at a run. As however, even this alternate use of the plants is sure to result in much wear and tear, with consequent suffering to the plants, it is necessary to keep all the plants in the open or in the greenhouse throughout the summer months from May to October, or to have an additional set of plants permanently in the open to draw upon as required.

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XX.

## HINTS FOR THE ORCHARD.

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**U**NDER this heading it is only possible to refer very briefly to some hints on the general management of the Orchard.

Those requiring fuller information may turn over the pages of my work on the "*Cultivation and Diseases of Fruit trees in Maltese Islands.*"

The Orchard, like the Kitchen-garden, is an indispensable adjunct of every well-appointed country residence. The size of the orchard must depend on the extent of the space available and on the requirements of its owner, in the same way that the assortment of fruit-trees is dependent on his tastes. Where no space is available for a separate orchard, the trees may be planted along the walks of the kitchen garden, or even along the walls of the ornamental garden. This arrangement is of course, applicable only in the case of trees which do not usually grow to a large size or which are periodically pruned back and their size kept within reasonable limits. Thus, it is possible to plant pears, apples, plums, apricots, Japanese Persimmons, and occasionally even peaches, nectarines and pomegranates along the walks of the kitchen-garden, at a distance of 2 or 3 metres apart, and about 1 metre from the edge of the walk. Citrus fruits, such as oranges, mandarin-oranges etc., are best planted along a southern wall; lemon-trees do just as well or better along a northern wall. Fig-trees can be planted in a sheltered corner, and the ground which they cover can be reserved for the cultivation of autumn or winter tomatoes, vegetable marrows and French-beans, celery, seed-beds carrot-beds etc., but as a rule the roots become too troublesome for summer cultivation requiring frequent watering. A sheltered corner looking east may be reserved for bananas. Where the space is limited, it is necessary to grow the trees in a manner so as not to throw too much shade below them. The cordon and espallier type of training is therefore recommendable in such cases; the fusiform or narrowly pyramidal shape, and the vase-shape come next; and besides being more easy to

grow, are also on the whole more productive. The sorts to be grown should be selected in a manner to afford a great variety of ripe fruit extending over as long a period as possible, commencing from the earliest and finishing with the latest. However, the selection of varieties ripening at the same time had better be limited to 2 or 3, selecting the very best, otherwise the object of the grower to provide a succession of fruits for his table may fail in its principal aim to secure an adequate supply. All fruit trees should be manured regularly in autumn or early spring, and the soil around them should be kept clear of weeds and in good condition of tillage. All of them must be watered with more or less regularity throughout the dry season; and this rule is especially applicable in the case of Citrus-fruits, Stone-fruits and Kernel-fruits, but all of them derive advantage from an occasional watering, which improves the vigour of the tree and the size and quality of the fruit. In the case of Kernel fruits, and also of many Stone-fruits, watering may be withheld for at least ten days before gathering the fruit, in order not to affect its keeping quality in the fruit store. Trees surrounded by beds of vegetables need not be watered, as they derive what they require from the beds around them. The true period for planting leaf-shedding trees is during the winter months (December-February). Almond-trees, and Peaches and Nectarines grafted on the Almond are best transplanted in December, as the roots of the Almond resume active growth as early as January. Pear-trees and Apple-trees can be transplanted as early as October, provided that they are stripped of their foliage, leaving only the terminal leaf on each branch, to assist the tree to re-establish itself before winter, without compelling it to put out new shoots so late in the season. The soil should be firmly packed around the stems of newly transplanted trees, in order to avoid failures, and if the soil is somewhat dry, a good watering should also be given. Citrus fruits are best transplanted with a ball of earth, from May to September, the branches are trimmed back a little, and the trees are watered at first every eight days and afterwards every fortnight. Sprayings in the evening are very beneficial to newly transplanted Citrus-trees. The Loquat may be transplanted with a ball of earth in February-April, or again in September-October, and the

same rule followed as regards watering. The manure should not be placed in immediate contact with the roots of newly transplanted trees, and in the case of the Loquat-tree has better be withheld altogether.

The Orchard is liable to suffer from excessive moisture at the roots, as it is from actual shortage. It may be mentioned in particular that all Rosaceous trees, such as Stone-fruits and Kernel-fruits, become much more subject to infection with the fungus *Armillaria mellea*, which causes root-rot, if there is any stagnant or excessive moisture during summer. Too much watering, beyond what is necessary to secure fruit of the proper size, is sure to result in the fruit becoming too watery and flavourless, and the tree continuing its growth far into the summer, is often unable to form and mature the flower-buds necessary for next year's crop. On the other hand, watering should not be altogether withheld in late summer and autumn, as otherwise with the first autumnal rains, such trees as pears, apples and plums, are easily thrown into bloom, which of course means the partial or total loss of next year's crop. Even in the case of oranges and mandarines, flowering abundantly in autumn, the chances of a good crop for the following year are poor indeed.

The pruning of Citrus-trees is best done in the summer months, May-September, but is sometimes done with advantage early in February, when the young shoots are just forming, but as soon as these flowering shoots have reached the length of 1 to 2 c.m. pruning becomes inadvisable and even positively injurious. The orange-grove is pruned every two years, but a slight pruning or trimming just enough to remove twigs injured by the weather or otherwise diseased, may be resorted to in June. The seedless oranges dislike pruning, except such as is necessary, to give them shape and to remove dead or superfluous wood, and in their case any pruning at all heavy is sure to result in loss of fertility for one or two years.

Table grapes may be grown either trailed on a pergola to cover a space or walk, or as an espallier or cordons along garden walks, or also trailed on supports or poles. Vines grafted on American stock, particularly on the *Berlandieri* hybrids (*Ber-*





landieri × Riparia 420 A, Berlandieri × Riparia Gloire 157-11, or Chasselas × Berlandieri 41B.) have proved to be very vigorous and fertile. A sunny situation is essential, preferably one looking towards the east. Vines, of course, must be pruned every year, in December-February, and green pruning or trimming must be done twice or thrice early in the season, until the berries have set. Dustings with sulphur are necessary to prevent the attacks of *Oidium* (Mildew), and also to prevent too much shanking. The dustings must be applied when the flowers are blooming, and subsequently twice more at intervals of 10 or 15 days. Spraying twice or thrice with Bordeaux mixture is necessary to prevent outbreaks of *Peronospora* (Downy Mildew). When the bunch appears to be too compact, so that the berries may remain compressed or disfigured or may remain undersized it is advisable to resort to thinning by means of long pointed scissors. The best table grapes to grow in these Islands are: *White Grapes*; Muscat de Jesus or Muscat a fleur d'Orange usually called *muscatell*, Salamanna or Muscat of Alexandria, Insolja tal Ghirghenti, Folle blanc, (Mignuna bajda or Catlana), Nuccellata, Pizzutellu di Gattinara (Bezzula bajda), Lattuarina or Bormestia, Insolja ta Gerusalem: *Red or Black Grapes*, Frankenthal (Mignuna seuda), Gellenza seuda, Nigru gross or Portugues bleu, Dodrelabi, Darkaja noir (Gheneb tork), Gheneb tar-Rdum, Zebbugia, Black Muscat of Hamburg (*Muscatell issued*), Pergolese, (Mignuna seuda tauualia tal cannizzati).

The following is a selection of Kernel-fruits and Stone-fruits:

*Pears*: Madama, Beurré d'Angleterre, Beurré suprême, Clapp's Favourite, Belle des Bois, Duchesse d'Angouleme, Angelique de Rome, Conference, Settembrina, St. Michel Archange, Du Curé, Angelica di Malta, Le Lectier, Marguerite Marillat, Dr. Hardy, and the very late sorts La France, and Bergamote Esperen.

*Apples*: Red Astrakan, Hoover, Bramley's Seedling, Cox's Orange Pippin, Taint Frais, Reinette Baumann, Peasgood's Nonsuch, Banana, Calville d'hiver, Limoncella, and the local sorts.

*Peaches*: Sneed, Côte d'Azur, Amsden, Malta July, Boschetto Peach, Teton de Venus and Reine des Vergers. *Nectarines*: White Malta, Yellow Malta (a new sort originated at Armier near Curmi), Red Malta, and Fertile de Poitou.

*Plums*: Greengage, Golden drop, Giant, Pruna di Frati, St. John's plum, Perniciona, De Pontbriant, Reine Claude noir and the small *Mirabelle* plums.

*Japanese plums*: Botan, Kelsey and Satsuma. *Apricots*: May Apricot, Alexandrine Apricot, Peach-Apricot and Rouge de Roussillon.

## HINTS FOR THE KITCHEN GARDEN.

**A**LTHOUGH many vegetables can be grown in the spaces between the fruit-trees in the orchard or in the orange-grove, particularly during the wet season, it is always advisable to reserve an open space in a sunny situation for the kitchen-garden proper. Of course, the extent must vary according to the requirements of the household, and the possibility to raise also some vegetables in the spaces between the rows of fruit-trees, but for the ordinary needs of a small household an area of about 1000 square metres, or about  $\frac{1}{4}$  acre (a little less than one *tumolo*) will be found sufficient for all purposes, including the raising of a small crop of potatoes. In such a limited space the cultivation must be very intensive, with regular irrigation and liberal supplies of manure. The ground is trenched and manured every second, or at most, every third year, with surface dressings of manure to be applied when a second crop is planted or sown after taking in the first. After a crop wholly raised by irrigation, such as pumpkins, early autumn cauliflowers and kohlrabi, and an early winter or autumn crop of potatoes, autumn tomatoes, and most other irrigated summer and autumn crops usually grown on land newly trenched and manured, a good surface dressing of manure must be given, and deeply digged in, before planting or sowing the subsequent crop. A crop of beans and peas, grown only partly by irrigation, does not affect the land to the same extent. Indeed it is often possible to grow these crops in the second or third year after trenching, with a little surface dressing of manure, or with some well-rotted manure applied directly along the seed-drills.

The seed beds, and vegetable beds, should be disposed in a manner as to convey to them the water by gravitation from the small open tank in the upper part of the garden, but it is neither necessary nor advisable to irrigate all the seed-beds etc., at one time or in the same day, unless of course this is done to utilise the work of extra hands which may

happen to be employed in the garden on that day. Where there is a water-service under pressure, watering by spraying with a hose is in most cases preferable to irrigation, provided that the spraying is sufficiently copious or prolonged to be equivalent to a watering. Tomatoes, aubergines, capsicums, gombo or okro, pumpkins, gourds, and cucumbers are liable to become mildewed under too much spraying, and some tender plants, as lettuce and French-beans, may have the foliage broken or otherwise damaged by too much spraying. Other plants such as rocket, mustard, chervil and most seedlings in beds should be watered by spraying rather than by irrigation.

All chemical fertilisers can be used with advantage in the kitchen-garden, as required. This is particularly the case with nitrogenous fertilisers, especially nitrate of soda, under the influence of which, the plants acquire great vigour, with a pronounced increase of production. Of course, in giving nitrate of soda it is necessary that the other constituent substances, chiefly phosphates and potash salts, are not lacking in a readily assimilable form. Nitrate of soda has a tendency to cake the soil too much, if its application is frequently repeated, and in that case a fallow or semi-fallow crop, such as beans, peas, or winter vegetables, should be sown to take up the excess of salt resulting from previous cultivations. The application of liquid manure is also frequently resorted to in the cultivation of vegetables, and the practice is recommendable for most crops, especially for root-crops, provided that the liquid manure is applied from two to three weeks before the vegetable is ready for use.

The use of liquid manure is often objected to on the score of possible contaminations or infections, and indeed it does not appear to be recommendable for such vegetables, like lettuce, endive, rocket, mustard, radish etc., which are usually eaten raw, even if one takes the precaution to allow an interval of two or three weeks before taking up the vegetables for use. But in the case of vegetables which are cooked, or which are stored and kept for long intervals such as pumpkins, potatoes etc., and for such vegetables like arti-

chokes, beans, gombo etc. which do not come in contact with the liquid manure, the same objection does not arise. Moreover when the liquid manure has been prepared from old and well-rotted manure, or when the origin of the manure is well known and free from suspicion, no danger need be apprehended.

Certain vegetables, such as artichokes, cardoons, Asparagus; such sweet-herbs like spearmint, peppermint, marjoram, estragon, thyme, sorrel, sage etc., and also strawberry-beds, are kept for two or more years, and in this case after the initial deep trenching and manuring, the soil only receives the periodical surface digging, with one or two dressings of manure every year.

An Asparagus-bed may be made either by making use of old clumps cut up into suitable sizes or by rearing seedlings. The soil must be deeply trenched and well manured, and the surface layer to a depth of about 20 c.m. should be well cleared of stones; the old clumps are taken up in December-January, with as many of the more recent roots as possible, and the clump is cut into pieces, each consisting of a mass of rhizomes with two or more terminal buds. The pieces are planted in parallel rows 40 to 50 c.m. apart, with a spacing of 50 to 70 c.m. between the rows, the "crown" or rhizome being placed at about 10 c.m. below the level of the ground, so that when the soil is earthed up along the row, the crown will be at a depth of about 15 c.m. The rows are moderately watered throughout the winter and as fresh growth is started in spring. For the first year the Asparagus-shoots will not be strong enough or numerous enough, but from the second year and until the clumps become too old, full returns may be expected. The surface should be kept in a perfect state of tilth, and of course free from weeds. The shoots should be cut when they are about 5 c.m. above the mound of soil, that is when they have reached a total length of about 20 c.m., and the operation is best performed with a special Asparagus knife or scoop so as not to injure the terminal bud, and so put an end to the production of strong shoots from that bud for that season. Towards the close of the season a sufficient number of shoots should be allowed to remain in order to keep up the vitality of the plant and increase its vigour for

next season. Asparagus is also raised from seed, being sown in a well-manured seed-bed, and the seedlings can be transferred to the Asparagus-bed when they have acquired sufficient strength, that is in about two years. This operation is performed in winter, and the seedlings or rather the clumps are planted out at regular distances, as above mentioned. When the sprouting season is over, that is from July onwards, the few shoots which are thrown up, are sufficient to keep up vegetation, and water may be gradually withheld; but the annual dressing of manure should not be given until winter, when the dying vegetation is removed and the soil is deeply tilled and kept clear of weeds, the mounds being kept in position to mark the site of the dormant rhizomes.

The cultivation of the Artichoke requires much less skill. The land destined for its cultivation is deeply trenched and manured towards the beginning of autumn. At the same time the old Artichoke clumps or stocks are watered to induce them to throw up new shoots, and if the watering is done about mid-August or earlier, the new suckers will be strong and well rooted by the middle of September. These are taken up with a hoe, the outer leaves removed, and the inner ones shortened, and the suckers are planted out in rows on the site prepared for them. The rows should be one to one and a half metres apart, and the suckers are planted rather deeply, in holes, 50 c.m. to 1 metre from each other in the row. The young suckers are watered by hand a few times until well established, and then all that is required is to move the surface of the soil occasionally, and to keep down weeds. Some vegetables may be grown between the rows in the first season, in order to utilise the space, as the new plants will not have developed so as to cover the soil, before April or May, when with ordinary care some artichokes will be produced. In April and May watering must be resumed in order to keep up the vigour of the plants and induce them to produce a satisfactory first crop. It is not, however, before the second year that the plants are in full production. During the following summer the foliage dies off, and a period of rest supervenes, until the first rains of autumn cause the dormant plants to start into fresh activity. However, in order

to induce an early production of Artichokes it is the general practice, wherever possible, to irrigate once or twice the artichoke beds, about mid-August and in about three weeks, when the new suckers are well developed, to give a good surface dressing of manure and dig it in deeply, at the same time removing the superfluous suckers, leaving only 2 or 3 for each plant. Should the weather continue dry, irrigation must be continued at regular intervals to keep up the plants well in vigour, to resist the attacks of Aphis and of the various fungous diseases. Another dressing of manure may be given in February, and irrigation may become necessary in March and April should the soil become too dry.

Cardoons are best grown from seed, sown early in September, and the seedlings are transferred from the seed-bed to their destination soon after the first autumnal rains, in order to give them time to grow to full size by March-April, when the leaf-stems are tied up and blanched for about three weeks before cutting for use. Cardoons are planted in rows one metre apart, and 50 to 80 c.m. apart in the row, according to the expected development of the sort which is grown.

The proper time for sowing summer vegetables, such as tomatoes, capsicums, gombo, French-beans, marrows, gourds, pumpkins, cucumbers etc. is early in spring (March-April). Gombo or okro requires warmer weather, and is therefore sown somewhat late in April. It is best sown on the spot, as it does not bear well transplanting, and always suffers a prolonged check which greatly retards its growth. Holes are made with a hoe, 40 to 60 c.m. apart, well watered, and when the water is absorbed, 4 to 6 seeds are dropped in each hole and covered with soil to a depth of 2 or 3 c.m. Germination takes place in about ten days, and in a few days more the ground may be laid out for irrigating the plants in the rows, leaving the strongest one or two seedlings in each hole and removing the others. Tomatoes, aubergines and capsicums must be sown early in March in a very sunny and sheltered bed, so as to have strong plants to plant out in April or early in May. These vegetables are often sown in a garden frame as early as January or earlier, and in this way a supply of sturdy plants is obtained for planting out in very sheltered situations, in March or February for an early crop. Cucum-

bers are usually sown on the spot, but they can be also transplanted with a ball of earth from an earlier seed-bed, like long gourds, and this arrangement of course enables them to be sown earlier for an early production. Marrows and pumpkins are always sown on the spot, on land freshly trenched and manured; the marrows being sown in rows 1 metre apart, and about 1 metre from each other. The holes are watered, and 2 or more seeds are dropped as soon as the water is absorbed, and slightly covered with earth. When the first leaf is formed, the strongest seedling is retained and the others are pulled out, the ground being levelled and reduced to a fine tilth to preserve the moisture. Marrows are also sown under irrigation, about midsummer, to obtain a very welcome crop of this delicious vegetable throughout the autumn. Pumpkins and long gourds are always grown under irrigation, and are perhaps our most exacting vegetables as regards irrigation. For small households the large pumpkins are not recommendable, but the small and excellent "Nantes" pumpkin, as well as the "Corfu" pumpkin, called also "the poor man's bread," are very good substitutes.

Tomatoes for late summer and autumn crops are sown in June to August, and of course are grown entirely by irrigation; by sowing tomatoes late in August and planting out the seedlings in September on well prepared land, in a sheltered corner, a fine crop of tomatoes is secured throughout autumn and a considerable part of winter, but the plants must be trailed on reeds, to prevent them from rotting by contact with the wet soil.

French-beans are always in request, and should be grown throughout the spring, summer and autumn, for a regular supply of tender pods. The dwarf sorts are more grown, and as a rule are earlier than the climbers and just as productive. They are sown in beds, in holes 25 to 40 c.m. apart, putting 3 to 5 beans in each hole, and until they have germinated should be watered rather sparingly. When in flower watering must be on a liberal scale, in order to secure a prolonged supply of tender pods. Several sowings may be made throughout the summer months, commencing from March until the



close of September, at intervals of one month. The stringless sorts are of course preferred, and it is also a good practice to prefer the white-seeded sorts so that any excess of seed-beans not required for sowing, may be utilised as salad or otherwise cooked. The Asparagus-bean of Cuba (*Dolichos sesquipedalis*) is a vigorous climber, requiring much irrigation and warm weather to grow properly. It is sown in rows, 50 c.m. apart, late in April or early in May, and trailed on long reeds. This is an exquisite vegetable, quite stringless, the long slender pods often measuring more than half a metre in length, and is used just like ordinary French-beans, the plants continuing in bearing throughout the summer. The short flat-podded *Dolichos Lablab* is another climber, with white flowers, but the pods though quite tender are rather insipid.

Broad-beans are sown after the first autumnal rains, in holes 80 c.m. to 1 m. apart, putting two beans in each hole. The subsequent hoeings after germination must be done in comparatively dry weather, at the second hoeing earthing up the plants conveniently to induce them to throw up many strong flowering stems. Besides *Aphis* and rust, which are often troublesome, the great enemy of the bean is the broom-rape (*Orobanche speciosa*), but by sowing somewhat late, that is from one month to six weeks after the first rains, the young invisible plant of the broom-rape which is already in germination, dies off, not finding the roots of the host plant on which to fix itself. This simple precaution, which is now being commonly adopted on my recommendation, is very useful and effective, especially for red soils. Beans so grown need not be watered, unless the weather is too dry during the podding season. Beans are sometimes sown as late as the commencement of January, for the production of a late crop to be used as vegetable. In this case the beans are grown by irrigation, or at least must be irrigated when they commence flowering in April, as the soil becomes then too dry for the development of the pod. These late beans are sown in beds, ready made for subsequent irrigation, and the seeds or beans are usually sown singly, 25 to 30 c.m. apart.

Peas are sown much at the same time as beans, but they require a better preparation of the land, and do best on land

recently trenched and manured, or after a crop of summer potatoes. The holes are made 25 to 50 c.m. apart, the larger distance being reserved for the tall climbing sorts, while for the dwarf sorts a distance of 25 to 35 c.m. is sufficient. Very early sowings, of course under irrigation, are often made from the commencement of August or even earlier, the object in view being to obtain a very early crop of peas in October-November. The pea is also subject to the ravages of the broom-rape, and in this case late sowings give the same good results, but then the crop usually requires to be watered to bring it to maturity. The varieties *Mc Lean's Blue Peter*, *Serpette*, *Fillbasket*, *Daffodil*, *Daisy*, *American Wonder*, are good dwarf sorts. *Alderman*, *Duke of Albany*, *Market Gardener*, *Delicatesse*, *Perfection* etc. are tall growing sorts. For a very early crop, the tall sorts *Earliest of All*, and *Early Morn*, and the dwarf sorts *Eight Weeks* and *Early Dwarf Favourite* are recommendable. The well known "Bona" pea and our local or Malta pea, from which the Bona pea has originated, are excellent for the table and are also very productive. Peas like beans, are subject to the attacks of a weevil, which usually deposits its eggs in the pea or bean when the pod is still quite green and young. When fully developed, the weevil comes out leaving a hole disfiguring the pea; but as the weevil rarely attacks the plumule of the seed, the weevil-affected peas germinate just the same as those which are uninjured.

Lettuces are in request all the year, and it behoves the gardener to be able to supply them at all seasons. Of course, spring is the proper season for lettuce, and all the seed required, if possible, should be saved from plants maturing at about that time. Lettuce-seed will germinate with difficulty if sown in the hottest period of the year (June-September), with the result that there is often a shortage of this vegetable in August-November. The seed will germinate more readily if kept moist, wrapped in a wet cloth, for about 24 hours or more, and then sown in the usual way, the seed-bed being kept well shaded until the seedlings have acquired strength. Then the shade is taken off for a few days, so that the seedlings may harden and become fit for planting out. The best Cos or Roman lettuces to grow are the *Ballon*, *Giant Blonde*

*Paris*, *Giant of Potenza*, and *Giant White*, which are usually self-folding and form a large oblong head if allowed to attain full size in spring, but will also give satisfaction at all periods of the year. The Cabbage Lettuces rarely prove satisfactory in summer, as the head does not form readily, but are more desirable in winter, and especially in spring when they are really much superior in quality to the best Cos Lettuces. The well known *May Queen*, though rather small, is deservedly popular, being at its best in March-May. The *Parisian*, the *Tyrolese*, the *Malta Drumhead*, the *Perpetual* etc. are also often grown; the *Malta Drumhead* though a little coarse in texture at other seasons, is much appreciated in winter and early spring.

The roots, such as Parsnips, Beets, Radish and Carrots, are sown in beds or drilled in lines, and then thinned out if necessary. However, the beet bears transplanting well, and indeed its development is much improved by this operation. Radishes will develop their best qualities only in autumn and winter, and so are also carrots and beets; but carrots are nowadays sown all the year, especially in spring, to secure a continuous supply. Beets are grown in the same manner, but they become rather coarse and fibrous in summer. In fact the best beets are produced in winter and spring, and are sown in autumn and winter. The so-called black-rooted summer radishes are always too tough and too acrid, and hardly deserve attention.

Jerusalem Artichokes are sown early in spring, tubers or pieces of tubers being planted at a depth of about 10 c.m. and 30 to 50 c.m. apart. They do well in any situation, but are usually relegated to a shaded corner of the garden, where other vegetables will not do well. They require to be watered more or less regularly in summer, and especially in autumn when the tubers are forming. The land should be well manured, and a top dressing of wood-ashes may be added, the plant being a huge feeder, and large crops are the rule. The Jerusalem Artichoke is a delicate vegetable of easy digestion, and should be grown more extensively than at present, but it is regularly sold at the market during winter. When lifted and stored, this tuber is apt to shrink and shrivel,

and therefore it is advisable not to lift from the ground at a time, more than what is required for a few days' supply. A variety with more even and smooth tubers is also under cultivation.

The Sweet-potato is now being grown more frequently, and is propagated in spring, by planting out the root or tuber, whole or cut into large pieces, or by means of the layers which are produced naturally and abundantly. The soil should be of a sandy texture and well manured, and irrigation must be continued periodically throughout the summer. The crop is lifted as required, from autumn until spring.

Supplies of potatoes are obtainable at the market throughout the year, but if particularly early potatoes are required or if it is desired to have a particular sort which is not always procurable, their cultivation may be attempted. It is advisable to grow potatoes on a red soil, in a fine condition of tilth and heavily manured. Very early potatoes should be sown in a very sheltered situation, and the first sowing may be made in the first or second week of December, and another sowing may be made after two or three weeks. It is often possible to make use of seed tubers reserved from the previous spring crop, and these if sown early in December usually produce a nice crop of tubers of middling size, maturing in the first or second week of March. The early winter crop is sown, under irrigation, often as early as the middle of July in order to have a crop maturing in the first days of November. The best sorts to grow are the kidney varieties *Up-to-Date*, *Tinwald Perfection*, *Sharpe's Express*, *Golden Wonder* and *Arran Chief*.

Celery for bleaching can be grown easily throughout the winter and spring. The seed is sown in a bed or pan, early in October, and the seedlings are planted, out at a distance of 20 to 30 c.m. apart, in a soil deeply digged and well manured. At first, the plants are best watered by spraying, but later on may be watered by flooding, should the weather continue dry. When the plants have reached a convenient size, bleaching may be applied by tying up the plant and surrounding the bundle of leaf-stems by a covering of straw or by pieces of canvas, or by sheets of zinc or other material, in a manner to exclude the light. In about 15 days the stems or leaf-stalks will be sufficiently bleached for use.

The various vegetables of the Cabbage tribe, viz: Cauliflowers, Cabbages, Kohl-rabi, Brussels Sprouts, Broccoli, and Turnips, are too important to be omitted even from the smallest kitchen-garden. Cauliflowers and most cabbages are sown in April- June, and the seedlings are planted out in June-September, in some cases even later according to the sort grown. The very early cauliflowers, commencing to form the ball towards the close of September, and the early cauliflowers maturing in November, must be grown wholly by irrigation, from the moment that the seedlings are planted out. The others may be *dry-framed*, that is planted out in June-July on land previously trenched and manured, and when established, water may be withheld, wholly or almost wholly, the plants continuing alive and making very little growth until the commencement of the autumnal rains, when they start growing with marvellous rapidity, and soon make up for lost time. Most cabbages are dealt with in the same manner, but the very early cabbages of the "Express" type must be treated in the same way as the early cauliflowers. Late cabbages, such as Alsace, Schweinfurth etc., are sown in September-October and the seedlings are planted out in January-February, for a late spring or summer production. Brussels Sprouts are best sown in June-July in order to have strong plants for planting out in September-October, but may be sown also in September for a late spring crop. The various types of Broccoli are sown according to the season to which they belong; summer broccoli being sown in February-March, autumn broccoli in April May, and winter broccoli may be sown in June. Late Broccoli, such as Late Mammoth or Whitsunday Broccoli are best sown in May-June and planted out in August-September. The sprouting Broccoli, of which there are the early, the winter or spring, and the late sorts, are sown in April-September according to their season of maturity. The exquisite "Santa Teresa" Broccoli, often called Black Sicilian Cauliflowers are sown in April-May, and planted out in September, and their large dark violet heads, which turn green when cooked, are produced in December-January.

Further information on the sowing and cultivation of vegetables may be had by reference to my work "Semina di Ortaggi e Prodotti di Gran Coltura, published in 1918, by the Società Economico-Agraria,

## CALENDAR OF GARDENING OPERATIONS.

### JANUARY.

#### THE FLOWER GARDEN.

**K**EEP the ground clear of weeds, but do not work it if too wet. All spring flowering annuals, such as Calendula, Centaurea, Gaillardia, Coreopsis Iberis, Malcolmia, Delphinium, Malope, Nigella, Eschscholtzia, Lobelia, annual Chrysanthemums, Chinese Pink, Godetia, Clarkia etc. should be planted out at once, if not already planted. Stocks, Hollyhocks, Aquilegia, Lunaria, Salvia argentea, Digitalis, Campanula medium, Antirrhinums, Pentstemons, and other biennials or herbaceous perennials, should be shifted to their final destination, otherwise they cannot be expected to flower in the first year. Perennial ornamental grasses, such as Gynierium argenteum, Eulalia zebrina etc., Bamboos, Aspidistra (Parlour palm), Ruscus aculeatus, R. hypoglossus, Asparagus plumosus and other species, Agapanthus umbellatus etc., may be multiplied by dividing the rootstock. Annual grasses, such as Briza, Agrostis, Lagurus etc., may be planted out without delay, or sown at once on the spot, and thinned out early in February.

Plants cutting of Roses, Veronica, Carnations, Geraniums, Bignonia, Jasminum, Salvia, Viburnum, Hydrangea, Virginian Creeper, Verbena, Ivy, Myrtle, Box, and most spring-flowering deciduous or evergreen shrubs.

Roses should be grafted during this month and the next. The Manetti rose or the Briar will do for most sorts where good fresh water is available for irrigation. Where only brackish water or second class water is available it is advisable to graft on the Pink rose (*Rosa semperflorens*) called also

Scotch rose, or on its half-rambler sort, which is more resistant to brackish water, and is much more hardy, longer lived and also more resistant to drought.

Ornamental trees and shrubs; whether evergreen or deciduous, should be pruned now; but summer-flowering shrubs, such as Hibiscus, may be pruned later on. Divide the roots of Chrysanthemum and Leucanthemum for the flower border. Suckers of Chrysanthemums, intended for pot-culture or for large blooms, may be separated now, placing 3 or 4 in 6 inch pots, in a good compost of earth and well-rotted manure.

Camellias are beginning to bloom and may be shifted from one pot to another without injury. Bruyere-soil (Erica leaf-mould) is the best for them but costly; chestnut leaf-mould, carob leaf-mould or peat are also good. A good compost for Camellia, Azalea and Gardenia consists of chestnut leaf-mould, 3 parts, "terra di bosco" or siliceous sand 1 part, well mixed and laid over a thick layer of rotten carob-wood, with a layer of crocks at the bottom.

In the greenhouse divide rootstocks of Ferns; shift Ferns, greenhouse palms and shrubs, Dracaenas, Crotons etc. Keep the greenhouse free from mouldiness and avoid watering except when strictly necessary. Primulas are making fine growth, and should have more light. A few Zonal Pelargoniums in pots placed close to the glass will add colour during the next three months. Rootstocks of Anthurium Scherzerianum may be divided now, and offsets of epiphytic ferns (Platynerium) may be taken off and fixed with moss and lead wire on properly shaped lengths of tree-stems, not less than 4 inches in diameter. Carob tree-stems are good for this purpose, but are liable to shed their bark; the stems of Melia Azedarach are better.

Dormant bulbs and tubers grown under glass, such as Caladium, Begonia etc., should be kept dry without moving them from their pots. Admit air and light on calm sunny days, but keep a vigilant eye on the thermometer.

## KITCHEN-GARDEN.

**T**HERE is very little to do, besides taking up grown vegetables and keeping down weeds. Working the soil when wet is injurious for subsequent crops, and red soils are particularly susceptible to injury. Spring potatoes should be sown without delay, and preferably not later than the middle of the month. Earth up Celery, Cardoons, Fennel; tie up for blanching Endive and Chicory. Leeks may be trenched in to procure a long white stem. Asparagus-beds should be deeply worked and manured. Extensions or renewals of Asparagus beds should be done now or early next month. Strawberries and late kohlrabi may be planted. Plant out and sow lettuce, radish, late peas and beans. Spinach may be sown for a late crop. Onions may be planted out from the seed beds, during this month and the next. White onions for pickling may be sown at the close of this month or in February, in order to have bulbs about as large as a hazel-nut.

## THE ORCHARD.

**J**ANUARY and February are the two months especially devoted to nursery work. Plant cuttings of Quince, Apple, Hawthorn, Plum and Sloe. Divide and plant suckers of wild plum, sloe, wild apple, crab, service-tree, cherry, and wild pear to be grafted next winter, or if irrigated may be budded during the course of summer. Cut down at or close to the ground old stocks of quince, wild plum, sloe, apple, and service-tree, and heap up earth on the stool to obtain a good supply of rooted suckers next winter. Sow walnuts, sweet and bitter almonds. Graft pears on quince stock wild pear and hawthorn; fine sorts of sweet almonds, peaches, nectarines, plums or bitter almonds; plums and apricots on wild plum or sloe; apples on hawthorn or on suckers or seedlings of wild apples; cherries on wild cherry and Mahaleb cherry.



Young deciduous fruit-trees may be transplanted. It is time to prune all deciduous fruit-trees, such as fig-trees, walnut-trees, pomegranates, almonds, peaches, nectarines, plums, apricots, cherries, pears, apples, quinces, service-tree etc. Sow plant cuttings of, and transplant olive-trees. Suckers taken along with a portion of wood from the base of the trunk, with or without roots, make nice trees in a few years. Olive-trees are also propagated by truncheons, or pieces taken from the base of the trunk, or by cuttings of branches about 2in. in diameter, properly planted in deep holes, well manured, and covered with a few inches of soil. Propagation by seeds is now preferred by most growers in Italy; the seedlings being planted out in the nursery at convenient distances, and budded at or close to ground level when the stem has reached the thickness of a lead pencil.

During this month and the next, it is time to prune, graft, and plant cuttings of vines. Vines grafted on American stock in the nursery, may be transplanted to their final destination.

The orchard and the vineyard should be weeded and digged, and if necessary manured.

In dry weather the orange grove should be weeded and digged; and a watering with tepid water from an underground tank will be found useful to further the development of flowering shoots.

## FEBRUARY.

### FLOWER-GARDEN.

**M**OST of the work left over from last month may be completed in this. Thus, all perennial grasses such as Pampas grass, Andropogon, Eulalia, Miscanthus, Panicum etc., as well as Bamboos, may be propagated by dividing the rootstock. Aspidistra, Tricyrtis, Crinum, Tradescantia,

Agapanthus, Asters, Rudbeckia, Phlox, Sedums, and sucker-producing perennials generally, may be propagated in the same way. Annual spring flowers are growing luxuriantly and are greatly improved if watered once or twice with liquid manure. Calceolarias should be repotted into well-drained 4 inch pots in leaf-mould, and kept under glass in the shade until they bloom. Early Cinerarias require to be repotted in 6 or 7 inch pots, and the soil kept fit and substantial by moistening the soil with liquid manure, to assist the formation of the flower head. Zonal Pelargoniums should be well manured and placed in a sunny and sheltered place to obtain a sturdy growth. Regal Pelargoniums must have a good dressing of manure and be placed in the most sunny corner of the garden. Both types of Pelargoniums do better if kept in an open situation but in the half-shade of tall trees. Roses may still be transplanted and shifted, the branches cut down to a good bud, and the roots trimmed. Roses established in the flower garden should be manured without delay, if this has not been already done in October. It is still time to repot Camellias, Gardenias, Azaleas and Rhododendrons; they are all shade loving plants, but Gardenias require also a very sheltered and warm situation to thrive well.

Sow seeds of Dahlias in pans covered with a pane of glass, to have strong plants to plant out early in April. Snails and slugs are busily destroying the young plants in the flower beds and seed beds, and should be trapped or picked by hand at sunrise and thrown into hot water or petroleum.

### GREENHOUSE.

**S**ERNS are already making good growth, but the propagation of other foliage or flowering plants may be continued this month and the next. Suckers or cuttings of Dracaena, Sanchezia, Justicia, Fittonia, Limonia, Centrasdenia, Pavetta, Pavonia, Pilea, Peperomia, Marantha, Sansevieria, Tillandsia,

Nidularium, Billbergia, Musa, Philodendron, Pothos, Anthurium, Alocasia etc., should be planted in sifted mould mixed with silver sand under glass covers. The more delicate greenhouse creepers and shrubs, such as Lapageria, Bignonia Lindleyana, Manettia bicolor, Franciscea, may be propagated by layering or planting well ripened cuttings in sifted mould and silver sand under glass. Towards the end of February sow Begonias, Gloxinias, Gesnerias, Tydaeas, Impatiens, Streptocarpus, and other greenhouse plants and shrubs. The seed should be scattered loosely over a layer of leaf-mould in a shallow pan, then lightly pressed down and kept moderately moist and covered with a pane of glass. Keep the greenhouse dry to avoid mouldiness, and give water sparingly. Give air to the greenhouse at midday on calm sunny days. Primulas are now in full bloom, and are a glorious ornament of the glass house, but for want of pronubal insects few seeds will ripen properly under glass, and unless artificial fertilization be resorted to, it is advisable later on to bring out the Primulas in the open and place them in the shade of trees, in order at least to save some seeds from the later flowers.

### KITCHEN-GARDEN.

**S**OW Radish, Lettuce, Spinach, Cress, Celery, Carrots, Beets and Kohl rabi for early summer use. Blanch celery, endive, leeks and cardoons. Plant out shallots. Keep strawberry beds clean from weeds and runners; dig in some well-rotted manure among the rows, in order to assist the fruit to set and acquire a fine size. Some straw distributed later on between the rows, will keep the berries clean. Sow vegetable marrows in a sheltered place for an early crop. Prepare land, by deep trenching and manuring, for summer vegetables, and also for melons, water-melons, marrows and pumpkins. Cucumber and Long Marrow may be sown in beds, to be transplanted in March, or may be sown directly in place towards the end of February. Tomatoes, Egg-plants or Mad-apples, and Sweet Capsicums should be sown now, preferably in a frame, and planted out in

April. The Chayote (*Sechium edule*), an excellent vegetable of the gourd family, may be sown now or next month against a sunny wall where it may extend at leisure and produce a large crop of its peculiar gourds in October-December.

### ORCHARD.

**N**URSERY work, plantation work, and general cultivation as indicated for last month, especially as regards transplanting, grafting and pruning of deciduous fruit trees, should be completed before the end of this month. Usually very little attention is given to the pruning of fig-trees. Fig-trees left unpruned cannot produce fine fruit. The inner shoots and all small twigs which generally surround the leading shoots produce little or no fruit, and help only to exhaust the tree, and to prevent the fruit from reaching its proper size, besides favouring the developement of parasites, and should therefore be removed. In order not to allow the leading shoots to prolong themselves indefinitely year after year, it is necessary to shorten a number of them every year, so that each one may break up into one or two shoots which become leading shoots in their turn. Pruning of deciduous fruit trees should be done at least every two years. Vines of course, must be pruned every year.

### MARCH.

### FLOWER-GARDEN.

**S**PRING annual flowers are commencing to bloom and in dry weather on no account should be left in want of water. If sprayed in the morning with a fine rose, the blooms will be finer and will last longer. One watering with diluted liquid manure will greatly assist the flowering process.

Towards the close of this month, roses will be forming the flower-shoots of spring and it is advisable to dust them with sulphur of the finest quality, or to spray them with a 1 per % solution of sulphide of potash to prevent the attacks of the rose-mildew. Late in March or early in April commence planting cuttings of *Coleus*, *Acalypha*, *Ficus*, *Achyranthes*, *Alternanthera* and *Fuchsia*. *Calceolarias* should have their last potting in fresh chestnut mould, and should be kept close to the glass in a well ventilated frame, in a sheltered and half-shaded situation. Seedlings of palms may be potted singly in small pots. The dainty *Phoenix Roebeleni* should not be potted off before the seedlings are at least two years old, with one or more characterised leaves.

Plant or shift bulbs of *Tuberoses*, *Vallota*, *Pancratium*, and *Eucharis*. Certain rootstock-forming plants, such as *Phormium*, *Funkia*, *Dianella*, *Luzul*, *Scirpus* and *Cyperus*, may be propagated by division. Tuberous *Begonias* may be potted in mould with a little old manure, and sheltered in the greenhouse until they show heads. Roots of *Dahlias*, roots of *Helianthus* and *Rudbeckia* may be planted out late in March. *Chrysanthemums* should have the second potting, or if desirable planted in the open ground.

Water-plants, such as *Nymphaea*, *Nelumbium*, *Pontederia*, *Cyperus*, *Alisma*, Japanese *Iris*es, etc., may be propagated by dividing the rootstock towards the end of March or early in April. *Nelumbium*, of course, will often suffer if allowed to remain in water throughout the winter. It is best taken up in its pot in November or December, and kept half-dry in a sunny position until the end of March, when the rootstock may be divided. Japanese *Iris*es are best grown in pots, half-dipped in water.

Sow palm-seeds and conifers; palm seed especially if not fresh, should be soaked in water for a day or two before sowing. Repot *Cactaceae* and plant cuttings of same. Pots of *Cactus* should be crocked preferably with bones roughly broken.

Towards the end of this month, and in the next, sow the summer annuals, viz: *Amaranthus*, *Balsams*, *China Asters*, *Alonsoa*, *Coamea*, *Clarkia*, *Bidens*, *Celosia*, *Helianthus*, *Heli-*

*chrysum*, *Gomphrena*, *Nicotiana*, *Thunbergia*, *Portulaca*, *Zinnia*, *Ipomaea*, *Convolvulus*, *Quamoclit*, *Ornamental gourds*, *Lantana*, *Capsicums*, *Snail-plant*, *Maurandia*, *Antigonon*, *Eccremocarpus* and most summer creepers. In sowing summer annuals raised beds should be used to prevent any excess of moisture, which is dangerous to the young seedlings. Some seed should be reserved for a second sowing one month later for late flowers.

## GREENHOUSE.

**P**ROPAGATION work by suckers or cuttings commenced last month may be continued in this. Sow *Coleus*, *Begonias*, *Shrubby Balsams*, *Gloxinias*, greenhouse palms, *Pandanus*, *Streptocarpus* etc. Plant tubers of *Achymenes*, *Gloxinia*, *Tydaea*, *Caladium*, *Methonica*, *Dioscorea*, *Amorphophallus*, *Eucharis amazonica* etc. Divide rootstock of *Asparagus*, *Anthurium*, *Bromeliads* and *Marantha*. Repot ornamental-leaved *Begonias*, *Crotons*, *Coleus*, *Cyanophyllum*, *Peperomia*, *Fittonia*, *Rhexia*, *Strobilanthes*, *Tabernaemontana* and most greenhouse plants. *Gardenia florida* and *G. Fortunei* may be repotted and taken out of the greenhouse, in a sheltered, warm and shaded locality. Paint and repair the greenhouse, if necessary, and white-wash the glass on the outer side, or make use of curtains to keep off the sun which would scorch the tender plants. Avoid damp, and remove all decayed leaves. Much of the success of the season depends on having greenhouse vegetation well started in this month or early in the next.

## KITCHEN-GARDEN.

**S**OW the same vegetables as indicated for the preceding month, viz: *Vegetable-marrow*, *Long-marrow*, *Egg-plant*, *Mad-apples*, *Capsicums*, *Tomatoes*, *Spring Onions*, *Summer lettuce*, *Orach*, *Cucumbers*, *Gourds*, *Melons* and *Water-melons*,

French beans and late peas. Blanch Cardoons, Celery, Leek and Endive. Transplant early Cucumbers, Tomatoes and Eggplant.

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### ORCHARD.

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**D**IG and, if necessary, manure the orange grove, and take off vegetables from among stone-fruit trees, which would otherwise draw too much on the reserve of moisture in the soil. Towards the end of this month paint the trunk of pears, apples, quinces and service-trees, from 8 inches under the ground to the branches of the thickness of a thumb with arsenical mixture made of 1 part of Vienna green to 25 parts of ashes and the same quantity of fresh lime, to prevent the attacks of tree-borers. No deciduous fruit-tree should be transplanted after the buds begin to move; but vines, pomegranates and fig-trees may be layered, if required.

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### APRIL.

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### FLOWER-GARDEN.

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**T**HE sowing of summer annuals should not be delayed further than this month, in order that the flower garden may continue in its robe of glory throughout summer and autumn after the gorgeous display of spring. Of course, *Portulaca grandiflora* may wait until May, and later sowings of *Zinnia*, *Tagetes* and Chinese Aster will secure a succession of flowers throughout summer and autumn. The spring annuals are now in full bloom, and the flower-bed should be kept moderately moist by frequent watering until the blooming

season is over. Sheep-manure given in liquid form provokes a luxuriant vegetation, which is indispensable to secure an abundance of fine flowers. Cinerarias and Pansies if planted in an open situation may be shaded off from the sun to prolong their blooming period. The early flowering bulbs and roots, such as *Narcissi*, *Tulips*, *Ranunculi* etc., are waning, but the bulbs should not be taken up from the ground before the leaves are entirely dry. The magnificent lilies, *Amaryllis*, and *Gladioli* are showing their flower-spikes, and should be watered freely, when blooming they should be screened from the sun without obstructing light, or if reared in pots may be moved to a shaded place to prolong their bloom. Liquid manure, supplied when the flower-spike makes its appearance, will help to increase the size of the flowers. The lilies, however, are not so amenable to this treatment, and in their case liquid manure should be given with great caution. The late-flowering lilies such as *Lilium tigrinum* which flowers in June, and *L. speciosum* which flowers later, are liable to rot if watered with liquid manure when the flower-scape is forming.

Dahlia tubers should be planted before the end of this month in a soil deeply worked and manured, and exposed to the full action of the sun. In order to propagate a desirable variety, the tubers may be planted in a flower-pot, and as soon as the shoots reach the length of three inches, they should be pinched off just a little above the tuber and planted singly in small pots with a good mixture of sandy soil, mould and manure, and left to strike under glass, keeping the soil moderately moist. Later on, Dahlias may be propagated by cuttings taken from the plant itself. Plant out seedlings of Dahlias in a soil prepared as for the tubers.

Palms and Conifers may be transplanted from the open ground now, and throughout the summer. In transplanting palms care should be taken to replant them a little deeper than they were originally; and large palms having already a stem some feet high should be planted at least a foot deeper in order to allow space for new roots to form.



## GREENHOUSE.

**A**LL propagation work by suckers, layers, cuttings, seeds etc., may be continued in this month. The same greenhouse palms, tuberous-rooted plants and shrubby or ornamental-leaved plants mentioned last month may be sown in this. Ornamental-leaved Begonias, especially those belonging to the Rex section, may be propagated from leaves under glass covers. Caladiums beginning to show leaves should be placed in the hottest part of the greenhouse, well shaded from the sun, and watered freely.

Water may now be supplied rather more freely to most greenhouse plants, and old well-rotted manure may be given to such as require it, and the soil stirred and mixed with the manure as well as possible without injuring the young rootlets. Greenhouse-creepers such as the tender Passifloras, Bignonia Lindleyana, Ficus repens, Pothos aurea, Vanilla, Aristolochia Siphon and grandiflora, Dioscorea, Cissus, Lapageria, Manettia etc., may be layered.

## KITCHEN-GARDEN

**T**HE vegetables sown last month require careful tending until they are sufficiently strong, to protect them from the attacks of snails, grubs and of a host of insects. Young plants of long marrow, mad-apples, tomatoes, capsicums, lettuces and summer cauliflowers, cabbages and kohl-rabi, may be planted out. French beans may be sown in succession, and runner-beans may also be sown. The excellent Asparagus bean (*Dolichos sesquipedalis*) may be sown before the end of this month, on well prepared ground, and will furnish a succession of its long tender pods throughout the summer and autumn. It is important to allow a part of the kitchen garden to remain fallow, by turn, during summer, that is by growing something which requires no irrigation, as the long summer drought will clear the soil of many insect-pests and plant-diseases.

## ORCHARD.

**B**EFORE the end of this month dig the orange-grove, if not dug already, and remove all vegetables etc., which may have been planted during winter for lack of sufficient space in the kitchen-garden. Apply the first dusting with sulphur or the first spray with Bordeaux mixture, on the young shoots of the vine, as a preventive against the attacks of Oidium and Downy-mildew. Dustings with refined triturated sulphur, containing 3 to 5 % of sulphate of copper is a good preventive against both diseases.

Towards the end of this month and onwards, young orange-trees may be transplanted safely. If the weather is dry, cuttings of figs and stone-fruited trees, and newly transplanted fruit-trees generally should be watered, to give the young buds a good start and to promote root-formation. Vines layered now will root well in about one month, and this is the best way to procure good plants of table grapes to be planted out next winter, provided the layers are made in the open ground, so that they give no further trouble beyond watering them twice or thrice to induce them to strike root. However, owing to the existence of the Phylloxera, it is now more advisable to plant graftlings on American stock.

## MAY

## FLOWER-GARDEN.

**I**N this month the gardener enjoys the result of his toil during the year. The flower-garden is in full bloom. But before the end of this month, most spring annuals will begin to fade, and their place must be filled up by the summer annuals, which by that time will be sufficiently strong to be transplanted

from the seed-bed into the flower-bed. The gardener should mark out those varieties which for beauty of shade, size of flower, or other quality are desirable, and from which he proposes to reserve seed. The choice of seed should be carefully attended to by the gardener. Many garden varieties have a tendency to revert to the original type, and this is particularly noticeable in new and unstable varieties. There is nothing so unsightly in a garden as a seedy flower-bed, and the gardener having settled his choice should remove all the other annual spring-flowering plants as soon as their bloom has faded. The ground should be deeply worked and manured, and left to be acted upon by the sun for a few days, before planting out the summer annuals. These should be planted out in the afternoon after the sun has gone off the bed, and should be well sprayed with water morning and evening for the first eight days. China asters should be planted out before the end of this month, but most summer annuals may be planted in June. All summer annuals require full exposure to the sun's rays; in fact they cannot thrive properly in the shade of trees, and should not be planted too thickly.

Geraniums in pots should be placed in the shade to develop the colour of the flowers. Cineraria and Calceolaria should be treated in the same manner to prolong their bloom; a too dry atmosphere or a draughty situation will soon cause the delicate flower of Calceolaria to wither. Plant cuttings of double Petunias, and take layers of Carnations, Pink and Picotees. Carnations in pots may be removed to a half-shady place, or may be plunged in the ground, pot and all, to prevent the sun from heating the pot and scorching the roots. Cacti are beginning to move, and should be manured and frequently watered. If left to dry for a week or two and then watered abundantly they will be thrown into bloom at once. Cacti and Succulents in general may be propagated by cuttings, or division of joints or rootstock, as required. Stephanotis, Jasmine, Ipomoea, Bignonia, and most summer-flowering perennial climbers may be propagated now by layering.

Camellias, Rhododendrons, Azaleas and Gardenias, are putting out new shoots, and should be removed to a cool and shaded nook in the garden. In our hot climate these beautiful

and valuable plants require much attention to grow to perfection. A so-called cool-house is indispensable for them. A cool-house may be constructed of wood-trellis work, painted green and leaning against the northern side of a stone wall. Of course, Gardenias require a warmer situation, and will do well during summer in the shade of tall trees. The cool-house should not be more than twelve feet high along the wall, sloping down to nine or ten feet in front, and about twelve feet broad. It may be shaded off with creepers or with cane-blinds painted green. The cool-house should not be exposed too much to currents of air, and a moist fresh atmosphere may be kept up by spraying the ground or shelves with water at least twice a day. Caves or artificial grottos well open to daylight make excellent cool-houses for ferns, Begonias etc., but woody flowering plants require top-light as well as side-light to grow well. The planting of seedlings or cuttings of Dahlia should not be delayed beyond the end of this month, if meant to flower this year.

## GREENHOUSE.

THE work is much the same as in April. From this month onwards, a well-constructed greenhouse, owing to the rise of temperature, becomes in reality a hothouse, in which most hothouse plants will grow well. Many greenhouse plants, such as Coleus, Crotons, Palms shrubby Begonias etc. must be taken out and placed in a sheltered and shaded place with a more congenial temperature. Greenhouse climbers may be layered, and seedlings of Gloxinia, Begonia, Streptocarpus etc. may be potted off singly.

## KITCHEN-GARDEN

THERE is nothing particular to do except to look after the young plants of melons, cucumbers, tomatoes etc., to keep them clear of weeds and dust them with sulphur to prevent infection. Jerusalem artichokes should be started well by a

liberal supply of manure and water. French beans and Asparagus beans are fast growing and should not be allowed to flag for want of water. The excellent May lettuces are at their best. Gombo or Okro may be sown in place, putting about 5 seeds in holes 2 feet apart, and then leaving only one or two plants for each hole. If not already sown in April, the sowing of a third crop of potatoes should not be delayed. Seed reserved from the winter crop of Up-to-Date, Tinwald Perfection, Golden Wonder and Early Rose are very suitable for this summer crop. Young flowering shoots of broom-rape should be pulled up and burned to prevent the pest from spreading. Strawberries are in flower and also in fruit; some clean straw placed between the plants will keep the fruits from getting soiled.

### ORCHARD.

**D**IG and manure the orange-grove; the pruning of orange-trees is best done from May to September. Dig and dust with sulphur the vineyard, and trim off the unnecessary growth. Irrigate the loquat trees to improve the fruit and develop new buds. All newly planted fruit trees should be watered regularly to help on the new growth. Established pear-trees and stone-fruit trees if watered now, will produce finer fruit and healthier growth. Shield-budding of orange trees, loquats, fig trees, olive-trees, pistacio-nut, pomegranates, and stone and pip-fruit trees may be done now and until September, whenever the sap is in movement.

### JUNE.

### FLOWER-GARDEN.

**A**LL or nearly all spring annuals are now exhausted, and the gardener should lose no time in replacing them by summer annuals. But Phlox, Salpiglossis, Lobelia and

Calceolaria will not cease blooming before the end of June. Seedlings of summer annuals should not be allowed to remain long in the seed-beds, where they become slender and feeble and perfectly useless. It is better to sow again seeds of summer annuals for late flowers, than to make use of drawn-up seedlings which cannot be made to give satisfaction even with the best treatment. Gaillardia and Scabiosa are now in full bloom, and will continue to bear flowers the whole summer. The magnificent Rudbeckia laciniata Golden Glow will be in bloom during this month. As regards the situation for flower-beds of summer annuals, the gardener should adhere strictly to the rule indicated for last month, viz: that summer annuals must have the full benefit of sunshine, otherwise they give only poor results. Dahlias are beginning to bloom, and will strike freely from cuttings, thus providing a supply of young roots for next year. All bulbs and roots which have flowered in spring may be taken up, left to dry in the shade for one or two days, and stored or stratified in boxes or shallow pots with sandy soil in alternate layers. They should be kept in a cool dry place, but no bulbs or roots should be lifted from the ground before all the leaves are dry.

In this month the gardener may commence summer carpet bedding, or mosaiculture, if he feels inclined to this kind of work, making use of plants having leaves of various shades of green, white, yellow, red, rose and purple, such as Alternanthera Achyrantha, A. sessilis, A. grandifolia, A. amoena, Amaranthus, Ajuga reptans, Perilla nankinensis, Santolina, Achyranthes, Coleus, Sedum, Echeveria etc. The plants usually employed for carpet bedding are easily propagated by cuttings. They are fast growers and require frequent waterings; they must also have a sunny situation and a soil free from roots of trees. The first clipping may be done in a fortnight after planting, and from that time the scissors must be kept continually in hand, otherwise the finest turnings of the design will become obliterated in a few days. Pattern bedding or carpet bedding may be carried out also in flowering plants, and for this purpose the dwarf compact varieties of flowering annuals will be found very useful, as the vivid colours of the flowers afford a good means to develop the most fastidious pattern, although necessarily they are not so permanent as in the case

of ornamental or coloured foliage-plants. The dwarf varieties of *Myosotis*, *Lobelia*, *Antirrhinum*, *Coreopsis*, *Zinnias*, *Verbena*, *Asters*, *Balsams*, *Gomphrena*, *Zonal Pelargoniums*, *Lantana* etc. are very suitable for this kind of work.

*Chrysanthemums* should now be shifted into full size pots and kept free from *Aphis* and from suckers which impede their growths. Great care should be taken not to over-water them, otherwise they may become chlorotic, from which disease they rarely recover in time to produce fine blooms. The best compost for them is a mixture of two parts of virgin red-earth, one part vegetable-mould and one part old manure, well mixed. To this compost may be added two or three tea-spoonfuls of super-phosphates for each full-sized pot; nitrate of soda may be applied later on, when the flower-buds make their appearance.

### GREENHOUSE.

EARLY tuberous *Begonias* are in bloom: *Caladiums*, *Gesnerias*, and *Tydaes* are in full development and require frequent waterings. *Primula chinensis* and *P. obconica* may be sown; and early seedlings of *Streptocarpus*, *Coleus*, *Gloxinia*, *Begonia*, and *Primula* may be pricked into small pots and gradually hardened off. *Gloxinia*, *Tydaea* and *Achimenes* will be in bloom before the end of this month.

A moist atmosphere in the greenhouse during summer fosters the growth of plants generally. Greenhouse plants should be watered early in the morning before the sun gets too hot; the floor, stone-shelves and plants may be sprayed at the same time, and again late in the afternoon.

This is the best time for propagating *Begonia Rex*, *Gloxinia*, *Peperomia*, *Sansevieria*, *Sintpaulia* etc. by leaves, and *Dalechampia*, *Pothos*, *Philodendron*, *Dracaena* etc. by cuttings, in order to obtain strong plants for next year.

### KITCHEN-GARDEN.

EARLY cucumbers, tomatoes and long marrow are in fruit; only the finest and first fruits should be reserved for seed. The same remark applies for mad-apple, and cap-sicums which will be in fruit before the close of the month. Melons and water-melons are setting the fruit and should be dusted with sulphur as a preventive against mildew. The potato-crop has been taken up, and it is better to allow the soil to remain fallow throughout the summer. The tubers should be stored in a dry room previously fumigated with sulphur, and should be well-covered with canvas or with a thick layer of garden soil to prevent the attacks of the potato moth (*Phthorimaëa operculella*). French beans are freely setting their pods, and require a liberal supply of water, and perhaps one watering with liquid manure. Plant suckers of, and transplant, bananas in sheltered and sunny corners. Late cabbages, kohl-rabi, asparagus, summer and autumn vegetables and also spring onions should be watered in dry weather. Seed-beds of lettuce, cabbages, cauliflowers, kohl-rabi, broccoli, Brussels-sprouts, cardoons etc. expected to yield their produce in autumn and winter, may be prepared and sown after the 15th of this month.

### ORCHARD.

COMMENCE watering the orange-grove as soon as the leaves begin to roll. Irrigation should be repeated every two or three weeks, according to the nature of the soil and sub-soil. It is recommended to water the orange-grove sparingly the first time, in order not to induce a too abundant fall of set fruit, and more liberally in subsequent irrigations. The fruit-fly is reappearing to destroy such oranges as are still hanging on the tree. Early apricots, peaches, nectarines, plums, pears etc. require watering hardly less than an orange tree. If pears are watered they will pay for the trouble by doubling the



weight of the crop and by improving the quality of the fruit. Of course, adult peaches, nectarines and plums, growing in good soils, need not be watered, although watering is always beneficial, wherever possible. Those varieties of the fig-tree requiring the operation, should be capricated from the last days of this month and again early in July. Newly planted fig-trees, pomegranates, olive-trees etc. should be watered regularly until the close of August.

## JULY.

### FLOWER-GARDEN.

**A**LL summer annuals should be in place before the 10th, and many of them are already in bloom. Asters (*Callistephus chinensis*) are particularly early, and are often in bloom early in June. Incessant and careful watering is all they require to bring them to perfection. However, watering by spraying, too often repeated, is dangerous for most summer annuals, especially Zinnias and Sunflowers, as they are apt to become mildewed. During summer, plants, especially plants in pots, should be watered early in the morning or late in the afternoon, and a daily light spraying with water will do much to improve their condition. Palms, and most evergreen and flowering shrubs, and indeed nearly all perennial florist's plants should be removed to the shade of tall trees to protect them from the scorching rays of the sun. An orange grove with tall trees affords an excellent shade. Stocks and wallflowers should be sown now in beds well manured and deeply worked, the seed lightly covered with earth and the bed strewn over with dry leaves or straw to prevent the soil from drying too much; a cane blind will serve the same purpose. Biennial flowering plants, *Lunaria*, *Aquilegia*, *Hollyhocks*, *Canterbury-bells*, *Fox-glove* etc. if sown now, in a somewhat shaded place, and

transplanted to destination early in autumn, like stock and wallflower, will bloom in the following spring and summer. All seed beds made in June, July and August are more liable to the ravages of insects, and the seedlings should be dusted with sulphur containing sulphate of copper, or may be sprayed with sulphide of potash or with a nicotine spray, to keep off the pests. Carnations, after the blooming season, should not be shaded or watered too much. Carnations in pots are liable to have their roots scorched if they are stood in full sunshine; in this case it is advisable to put the pot within another pot to prevent overheating. If watered in sunshine they are sure to rot off; indeed it is always dangerous to water plants in pots in sunshine, or while they are still hot from exposure to the sun.

Dahlias raised from seed or cuttings not later than this month will bear fine flowers in autumn. The Dahlia is deservedly called the queen of summer flowers and is an object of pride to all gardeners. Its luxuriant growth and abundant flowering during all the summer, as well as during the latter part of spring and early autumn, indicate that it requires more than an ordinary share of nourishment. It should be watered every two or three days, and should have occasionally a supply of liquid manure; it must also be propped and the soil about the roots kept loose as much as possible. Thinning out the buds will improve the size and shape of the flowers: but the Dahlia likes the sun and should never be shaded in any way to prolong the life of the flowers. Late in this month or early in the next the Dahlia may be trimmed back rather heavily; new shoots will form immediately and the Dahlia will flower in autumn as well as it did in summer.

Rose-bushes should be watered at least every two weeks and kept free from summer weeds. Where the soil is very good and naturally moist, and rose-bushes are well established and more than two years old, they may be watered less often in the early part of summer, and more frequently or more abundantly towards the close of September, in order to induce them to push on fresh growth which will bear a large crop of fine blooms in autumn and early winter. In any case, it is useless to try to have fine roses during the hot season. Climb-

ing roses of the Wichuriana class may now be trimmed back hard to induce them to throw up fresh leaders during the summer which will flower profusely in the following spring. Propagation by layers may now be adopted with advantage, and the rooted layers will be ready for planting out in October or November.

The large flowering species of Cactus are blooming, and the night-flowering ones are beyond doubt the most magnificent flowers in existence. They are deservedly called the "Queen of the night." Malta is a classic land for the culture of Cactaceae, and there is no reason why amateurs should not have at least the best species and varieties.

## GREENHOUSE.

**O**RNAMENTAL-LEAVED plants are beginning to make a show of themselves, and all defective or diseased leaves should be removed to prevent the infection from spreading. July is undoubtedly the best time to propagate those species which are usually propagated by their leaves, such as Begonia Rex, Gloxinia, Peperomia, Saintpaulia, Sansevieria etc. Achimenes, Gesneria, Tydaea, Caladiums are growing luxuriantly and require frequent waterings during this period. Many Orchids, Gloxinia, tuberous Begonia, Achimenes, Streptocarpus etc. are in bloom. Warmhouse Orchids may be shifted carefully so as not to check their growth. The best way to pot these and other epiphytic greenhouse plants is to crock the pot with pieces of charcoal or better with half-rotten chestnut wood or carob-wood mixed with a little leaf-mould and moss nearly up to the brim: a mixture of moss and leaf-mould is then spread over for about half an inch, and the roots of the plant spread evenly about and covered with half an inch of the same mixture, finishing off on the top by spreading a thin layer of fine green moss to improve the appearance and prevent undue evaporation. The plant may be kept in place by means of lead-wire secured

to the brim of the pot. The greenhouse should be sprayed with water early in the morning or late in the afternoon, and free ventilation allowed for at least one hour at noon everyday. Ornamental-leaved plants, such as Caladiums, Begonias, Dalechampias, Dieffenbachias etc. are easily damaged by direct sunshine or by condensed water dropping down from the glass of the roof in a damp greenhouse.

## KITCHEN-GARDEN.

**A**UTUMN and early winter vegetables may be sown now to be transplanted in place next month. Cucumbers, gourds, melons, water-melons, tomatoes, aubergines, capsicums etc. should be watered carefully to yield a continuous crop. Strawberry-beds should have creepers of rapid growth, such as pumpkins or gourds, trailed over them to protect them from the sun which would scorch them, and should be watered occasionally to obtain stout well-rooted runners for new beds. Early kohlrabi, cauliflowers and cabbages may be planted out to obtain a supply in September-November. Fennel, leek, turnips and carrots may be sown now for winter vegetables. Late and maincrop cauliflowers, cabbages, Brussels-sprouts and broccoli may be sown in beds for planting out in September-October, and the usual monthly seed-bed of lettuce and spinach should not be omitted.

## ORCHARD.

**E**ARLY summer fruits are ripening, and the gardener should be careful to pick up and destroy all fruits damaged by the fruit-fly. Pears and other fruits ripening up to the end of June are not very liable to the ravages to this pest, but

later on hardly any fruit except grapes, pomegranates, bananas and melons are entirely free from attacks of the fruit fly. The valuable varieties of pears, peaches and nectarines, ripening in July and onwards, should be wrapped in paper or provided with bags of cloth to keep off this pest which is unfortunately very common in every orchard. However the bags should not be put on before the fruit has reached its proper size, and is about to turn mellow. All stone-fruit trees may be watered regularly every two weeks till the 20th August, when further irrigation is unnecessary except for winter pears and apples. All apples and pears injured by the codling-moth (*Carpocapsa pomonella*) should be picked off from the tree every day and disposed of so as to destroy the larva inside the fruit. Pears and apples should have the stem and branches painted over again with arsenical mixture or with tar to keep off the wood-borers, as indicated for April. In the orange-grove the gardener has to continue the work commenced last month. As soon as the leaves begin to curl, the grove must be watered, otherwise most of the fruit which has already set will certainly drop off.

## AUGUST.

### FLOWER-GARDEN.

**T**HE gardener has enough to do in watering his flower-beds, shrubs and ornamental trees. Without assiduous watering the finest garden is soon reduced to a desert. The hardier bushes and shrubs should be watered at least once in ten days, and the flower-beds twice a week. Summer annual creepers are the creatures of water, and with them especially abundant watering secures luxuriant growth. Few sights are so charming or refreshing as a wall covered with a tapestry of morning glory or moon-creeper in full bloom. Other good summer creepers are *Mina lobata*, *Ipomoea*, *Quamoclit*, *Argyreja*,

*Antigonon leptopus* and *Aristolochia elegans*, these last two being perennials. Most summer annuals are now in full bloom. Flower-beds of *Zinnia*, *Tagetes*, *Petunias*, *Amaranthus* etc. may be trimmed to keep the beds in shape. Ornamental trees, particularly flowering trees, should be watered at least once in a fortnight and trimmed once or twice to secure even growth. The larger trees need not be watered more than four or five times during summer. In order to water them properly they should have a trench about as large as the shade of the tree, and water supplied in sufficient quantity to reach the subsoil. Flower-beds should be kept free from weeds, and the soil frequently stirred about the roots; and a top dressing of manure when the plants are thoroughly established and about to bloom, will impart vigour to the plants and prevent premature exhaustion. Late summer annuals, meant to flower in autumn, may be planted now. *Cactaceae* may be propagated now from cuttings with the greatest ease. In this month we may sow the early *Cineraria*, *Primula*, *Calceolaria* and *Salpiglossis*, in shallow pots, in good old leaf-mould, kept constantly moist and placed in a shaded situation.

### GREENHOUSE.

**D**URING this month and part of the next the greenhouse is at its best. Ferns, ornamental-leaved and flowering plants strive to surpass each other in beauty, and a year's toil is amply repaid. This is the best time for leaf propagation of several greenhouse plants as *Peperomia*, *Begonia*, *Tillandsia*, *Gloxinia*, *Tydaea*, *Vriesia*, *Sansevieria* etc. *Tabernaemontana*, *Achimenes*, *Gloxinia*, *Tydaea*, *Sanchezia*, *Anthurium*, *Bouvardia*, *Eucharis* etc. are in bloom. *Caladiums*, *Begonias*, *Alocasia*, *Cyanophyllum*, *Dieffenbachia*, *Marantha*, *Croton*, *Dracaena*, *Fittonia* etc. are displaying their gorgeous apparel. Fern-seedlings are now sufficiently strong to be potted off singly in 2 or 3 inch pots. Greenhouse creepers such as *Bignonia* *Lindleyana*, *Manettia bicolor*, *Cissus*, *Lapageria* etc. may be layered.

Give air to the greenhouse during the hottest hours of the day, but avoid dry warm draughts which are very injurious to greenhouse vegetation. Keep a moist atmosphere by spraying with water the shelves and floor of the greenhouse at sunrise and sunset. Insect parasites tend to increase rapidly in summer and should be kept down by the help of insecticides properly applied so as not to injure the foliage. Most of the work omitted last month may be done now. Chinese Primula as well as Primula obconica, Primula malachoides and other greenhouse primroses, and Streptocarpus may be sown now.

### KITCHEN-GARDEN.

**P**LANT cabbages, cauliflowers, kohlrabi, tomatoes and celery for autumn use. Tomatoes sown about the middle of this month and transplanted in September on ground deeply digged and manured, and trained up on props, will yield a very valuable crop of the finest tomatoes which will mature from November to March. A sheltered and sunny situation must be selected for this cultivation, and the young plants must be adequately watered so that they may make sturdy growth without any check, until cold weather sets in. The large smooth tomatoes, such as Trophy, Dobbie's Champion etc., should be preferred, or the large pear-shaped tomato (Giant Pear), may be tried instead. Sow early endive, lettuce, leeks, turnips, scorzonera, chervil, parsley, also late cauliflowers, broccoli, cabbages, Brussels sprouts, cardoons and beet. Sow winter potatoes in beds under irrigation for an early winter crop; and sow vegetable-marrow and squash for autumn use. Sow the black-seeded or winter vegetable marrow (*Cucurbita melanosperma*) in some place where it can extend its long trailing stems: this plant will furnish a useful crop of young gourds, similar to the vegetable-marrow, throughout the winter and early spring. Sow a few rows of peas in a shaded corner for early autumn and winter peas. Manure and water artichokes for an early crop. Asparagus seed may be sown now in a shaded bed, well manured and free from stones

in order to provide young clumps which will be fit for transplanting in one year or two. Summer vegetables such as aubergines, capsicums, cucumbers, lettuce, spinach, etc., should be watered frequently, and an occasional mulching of manure will do them good.

### ORCHARD.

**S**TONE-fruited trees are mellowing their precious burden and the fruit-fly has a good time of it. Rotten fruit should not be allowed to remain beneath the tree and cloth bags may be put upon the more valuable fruit to save it from this pest. Fruits just beginning to ripen may be gathered and ripened in a darkened fruit-store out of the reach of fruit-fly. Pear trees ripening after the middle of August should not be watered within ten days before the fruit is taken in, otherwise the fruit may be too watery and keeps very badly. Pears gathered some days before maturity and stored in the fruit-room will develop their fine flavour and other qualities better than if matured on the tree. After gathering the fruit the watering of the trees should be continued regularly, in order that they may not suffer from drought and get thrown into bloom by the first autumnal rains, which of course would destroy all hope of a good crop for the next year. Late pears should be gathered in September, and the large varieties which ripen in winter or early spring should be allowed to hang on the tree until the last days of October or even until the first fortnight of November, covered with their cloth bags for protection against the fly, and then carefully gathered and stored. Fig-trees may be propagated by layers or cuttings. These last may be of sufficient length and planted deeply in a slanting position, with the terminal bud one or two inches above the ground; or smaller cuttings may be planted in a pot and the young plants planted in place towards the close of winter or after the following midsummer. Prickly pears may be planted now. The cuttings consisting of 2 or 3 joints, should be allowed to dry a little for a week or more, and then planted, watered some days after, once or twice, and then left to themselves.



SEPTEMBER.

FLOWER-GARDEN.

THE gardener will have now to bestow much of his time on Chrysanthemums. A year's toil may be lost through a moment's carelessness. The plant is at the height of vigour, good stout shoots have developed, and in most cases the flower buds are showing. The plant should on no account be allowed to droop for want of water, but should be placed in the full sunshine and watered daily at sunrise or sunset, and if necessary even twice a day. The plant should be kept free from suckers, off-shoots and small twigs, and some liquid manure may be applied once a week. Many Chrysanthemums come best on the 2nd crown bud, for some of them a 1st crown bud is preferable, but a terminal bud should be selected only occasionally, that is when no second crown bud is available. First crown buds are sometimes troublesome to deal with, but generally they produce the largest and most perfect blooms; second crown buds usually produce smaller flowers but better coloured; terminal buds produce even better coloured blooms, but usually not of sufficient size for show purposes. Each shoot should be propped by itself, so that the foliage may have its due share of air and light, and to prevent the plant from becoming top heavy with the progressive development of the bud. Plants in pots may have from one to three blooms, but extra strong plants with four or five shoots may be allowed to have as many blooms, although always with some sacrifice of size. Plants in the open ground, properly grown, may bear as many as eight fine blooms. At the same time, the habit of each variety should be well noted in order that the selection of the bud intended for exhibition may be a correct one. When the bud is chosen and isolated, the plant should be watered again with liquid manure or with a solution of Nitrate of Soda, one spoonful to a gallon of water, with the result that the plant will throw all its strength on the development of the bud. If given too early, guano, nitrate of soda or other highly nitro-

genous manures, will only induce a luxuriant development of foliage, and a vexatious cropping up of shoots and suckers. Sulphuring, or spraying with sulphide of potash or other fungicide will prevent the attacks of fungi; nicotine spray or soot in powder will keep off insects.

Cineraria, Calceolaria and Salpiglossis should be sown now, if not already sown, in finely sifted vegetable mould. The seed should be very lightly covered, and watered by placing the pot in a shallow vessel with water. Keep the pots constantly moist in a cool shaded place, and cover them with a pane of glass, which should not be taken off before the appearance of the third leaf. Towards the last days of September, the gardener may sow the usual spring annuals and biennials, viz; Pansies, Phlox, Gaillardia, Coreopsis, Rudbeckia, Centaurea, Crepis, Omphalodes, Delphinium, Clarkia, Calendula, Iberis, Statice, Lobelia, Eschscholtzia, Papaver, Malcolmia, Arctotis, Mimulus, Malope, Myosotis, Antirrhinum, Linaria, Hesperis, Bellis, Reseda, Silene, Verbena etc. and also the true biennials or perennials such as Lunaria, Campanula, Aquilegia, Dianthus, Hollyhocks etc. The annual grasses may be sown now or next month. Stock and wallflower may be taken out of the seed bed and planted in place, if sufficiently strong.

Celosia, Amaranthus, Coleus and other summer ornamental-leaved plants are at their best. Alternanthera mosaic-work should not be clipped from the moment that the colours begin to develop. Dahlias and Zinnias are still blooming profusely, but the pretty and useful Chinese Asters are gone. Seeds of the cultivated varieties of summer annuals should be selected with great care and kept at hand for sowing next spring.

Lycoris aurea, Amaryllis Belladonna, A. formosissima, Sternbergia lutea and other autumn bulbs are blooming. Most spring flowering bulbs, such as Hyacinths, Narcissus, Tulips, Muscari, Ornithogalum, Ixia, Sparaxis, Freesia etc. may be planted out now.

## GREENHOUSE.

**G**REENHOUSE plants should be watered regularly but prudently; the least excess of moisture in the greenhouse during this month and the next, will bring about the development of moulds and the premature decay of ornamental-leaved plants and bulbous plants. Plants may be shifted from one pot into another without disturbing their roots. Tuberous Begonias and Caladiums require resting. The greenhouse should be cleaned frequently to keep down insect life.

## KITCHEN-GARDEN.

**T**HE gardener may sow parsnip, radish, turnip, beet, scorzonera, salsify, horse-radish, rhubarb, celeriac, celery, spinach, endive, chicory, leeks, onions, parsley, chervil, sweet-herbs, and the same vegetables already indicated for August. Plant in place cabbages, cauliflowers, broccoli, Brussels-sprouts and Kohl-rabi for a late crop. Plant tomatoes in sheltered situations for an autumn crop. Potatoes may be sown, without irrigation for a winter crop. A good autumn crop of vegetable-marrow under irrigation can be obtained by sowing some of the newly gathered seed, early this month. Bulbs of onions and shallots can be sown now, and allowed to develop with the first rains. The cantaloup melons are mostly ripe, and the long-keeping or winter-melons are ripening. Artichokes should be manured and watered for an early crop, and if there are too many offshoots, these should be reduced to two or three; the removed offshoots may be used to propagate the plant, if required.

## ORCHARD.

**I**N the first days of September most sorts of grapes will be sufficiently ripe for the table, except the late ripening sorts which will take about fifteen days more. These late ripening sorts may have their bunches protected with an inverted funnel-like cover of oiled paper, which keeps off the rain and protects the bunch from the ravages of sparrows, small birds and insects, without interfering with ventilation. Walnuts are ripening and the first rains cause the thick green skin to break and shrivel, and the nut to drop. Pomegranates will begin to ripen towards the end of this month. If it is intended to plant fruit trees next winter, prepare the pits now and leave them open, in order that the lower strata may have time to aerate themselves. Evergreen trees, requiring to be transplanted with a ball of earth, cannot be moved safely after the first rains. The orange-grove should be watered abundantly in order to induce fresh growth which will fruit next year, and also in order that the fruit may increase in size and develop properly. The loquat is about to bloom and should not be allowed to suffer for want of water.

## OCTOBER.

## FLOWER-GARDEN.

**T**HE sowing of all spring annuals and herbaceous perennials should not be delayed now. Before the end of this month sow Calceolaria, Cineraria, Salpiglossis, Omphalodes, Gailardia, Sedum, Coreopsis, Torenia, Alonsoa, Clarkia, Hebenstreitia, Mimulus, Reseda, Antirrhinum, Linaria, Aquilegia, Lunaria, Althea, Campanula, Malope, Phlox, Linum, Geum, Alyssum, Centaurea, Digitalis, Crepis, Aubretia, Verbena, Delphinium, Nigella, Statice, Sweet-peas, Calendula, Pansies, Nemophila, Candytuft, Scabiosa, annual ornamental grasses etc. Many of these, which do not bear well transplanting, may be

sown in place, during this month or even in the next. They may be sown thinly in rows, and then thinned out if necessary.

Early seedlings of *Cineraria* and *Calceolaria* may be pricked off in pans or on raised beds in the shade of trees, to strengthen before being potted separately or planted in place. The large-flowered *Calceolaria* had better be pricked off directly and singly into small pots, with fresh chestnut-leaf mould, and must be kept permanently under glass in a low frame, well shaded.

Plant bulbs of Hyacinths, Tulips, Freesia, Crocus, *Triteleja*, *Allium*, *Muscari*, *Scilla*, *Fritillaria*, *Ornithogalum*, *Narcissus*, *Ixia*, *Sparaxis*, *Galtonia*, *Ferraria*, early *Gladioli* etc. *Gladiolus Gandavensis*, *G. Nanceianus*, *G. Childsii* and other late blooming sorts may be planted also next month, or even as late as the first half of December. Plant also roots of *Eremurus*, *Asphodel*, *Ranunculus*, *Anemone*, *Dielytra*, *Cyclamen*, *Richardia*, *Kniphofia*, *Agapanthus*, and Lilies. Hyacinths and Tulips grown in pots require a good mixture of red soil, vegetable mould and sand. *Lilium tigrinum*, *L. speciosum* or *L. lancifolium* and *L. longiflorum* or *L. Harrisii* will do well in such a mixture, provided the pots are of sufficient size. Other lilies, such as *L. auratum*, *L. superbum*, *L. Martagon*, *L. sulphureum* etc., require leaf-mould and a rather shaded place. *L. candidum*, the beautiful Madonna lily, which is perhaps the finest of all cultivated plants, will do well in the open ground, preferably in a half-shaded place, and should be replanted every third year, in July-September.

Cuttings of Carnations, Picotees, *Veronica*, *Geranium*, *Pelargoniums*, *Ageratum*, *Heliotropium*, *Hypericum*, *Cuphaea*, *Libonia*, *Agathea*, *Gazania*, *Lantana*, *Buddleia americana*, and most herbaceous and half-shrubby perennials can be planted now and throughout the winter. Layers of Carnations and Roses can be removed successfully from the mother-plant. Pippings of Carnations and Picotees should be planted in shallow pots with friable earth and vegetable mould, placed in the shade for 3 or 4 weeks and sparingly watered,

Roses can be transplanted with safety, and if required cleft-grafted, now or throughout the winter. Cuttings can be planted in shaded places in beds with some well-rotted manure, and the moist heat of autumn will cause them to strike root immediately.

*Chrysanthemums* are ready to bloom, and should not be left in want of proper nourishment; a last watering with nitrate of soda much diluted, may be given. Constant inspection is needed to keep down new buds and suckers, which otherwise will appropriate the nourishment meant for the flower-buds.

The longer nights and the cooler air of autumn allow most annual flowering plants to grow luxuriantly. Flowers are now larger, their colours are more lively, and they keep better than in full summer; indeed we may say that with us October, November and a part of December are a second spring. The remarkable beauty of autumn roses is well known; in fact some roses such as *Adele Hameau*, *Laurent Carl*, *Auguste Comte*, *Jonkheer J. L. Mock*, *Richmond*, *Edward Mawley*, *Paul Neyron*, *Mme. Constance Soupert* etc. as a rule produce finer blooms in October-December than in spring. The autumn *Crocus*, *Sternbergia lutea*, *Lycoris aurea*, *Nerine undulata*, and other autumn-flowering bulbs are blooming.

## GREENHOUSE.

MANY tender shrubs and plants, as well as the less hardy palms such as *Thrinax elegans*, *Phoenix Roebelenii*, *Chamaedorea elegans*, *C. Sartorii*, *C. corallina*, *C. Ernesti-Augusti*, young *Howeas* etc., which had been placed in the open air in spring and summer; and particularly ornamental leaved plants, should be taken in for shelter in the greenhouse. Most ornamental-leaved greenhouse plants, such as *Begonia*, *Caladium*, *Codiaeum*, *Marantha*, *Alocasia*, etc. are gradually

fading off, except in very well situated and sheltered greenhouses. Water should be given sparingly and the greenhouse kept open only for about two hours at midday; but if the greenhouse is too wet it may be kept open for a longer period. In any case strong currents of air should be avoided. This is the season when decaying leaves, humidity, and lingering heat, favour best the development of parasitic fungi in the greenhouse, and therefore it is necessary to keep the house perfectly clean and free from the moist stagnant atmosphere which is so apt to form at this time of the year. Hardly any propagation work is possible, except perhaps sheltering and potting the more tender annuals, such as Primulas, Calceolarias, Cinerarias, and also others such as Pansies, which thrive better if sheltered for a few weeks under glass. This is a period of rest for most plants and no manure should be given to greenhouse plants before February. Greenhouse tuberous and bulbous plants, such as Caladium, Begonia etc. should be hardened off gradually, giving little or no water, and the pots with their tubers or bulbs kept in a dry place throughout the winter. Pine-apples, Libonia floribunda, Lapageria, most Bromeliads, and even the hardier Begonias, should be sheltered in the greenhouse as soon as the evenings get too chilly, so that their growth may suffer no abrupt check. All young ferns and Streptocarpus, raised in the fern-frame, may be potted off singly.

### KITCHEN-GARDEN.

**P**LANT out from seed-beds, onions, celery, leeks, cardoons, endive, lettuce; also late cabbages, cauliflowers, broccoli and Brussels-sprouts. Kohl-rabi may be planted out in successive batches. Sow turnips, spinach, beet, carrots, borecole, chicory, parsley, parsnip, radish, scorzonera, salsify, peas, beans and generally all kinds of winter and spring vegetables meant to grow and come to maturity without irrigation. Plant out at once some tomatoes against a sunny and sheltered wall for a late autumn and winter crop. Sow also some vegetable-marrow in similar situations; in both cases in a soil well-

manured. Divide roots of shallots, plant horse-radish, and clean strawberry beds from runners and decaying leaves. Jerusalem artichoke is maturing and can be taken up gradually as required for use. The early irrigated winter potatoes will be maturing about the end of this month or early in the next.

### ORCHARD.

**I**F required, manure should be supplied now to the orchard. Manure may be dug into the soil, or better trenched at a depth of 4 to 6 inches. Digging should not be carried deeply too close to the stem, to avoid the risk of injuring the large roots, where gangrene will set in immediately, this being the worst season for such injuries, there being no movement of sap and therefore no healing activities in the bark. Manure too freely given provokes luxurious growth to the detriment of the crop; it should be remembered that the orchard is not a kitchen-garden and ought not to be manured oftener than once in four years. It is also important to apply well-rotted manure, in order not to induce too active fermentative processes in the soil. Stone-fruited trees, such as pears, peaches, plums etc. are liable to suffer severely from an attack of gummosis by an overdose of manure. During the process of manuring, it is the custom to do some root-pruning at this time of the year. This is a delicate operation and should be done with great care, to prevent possible injury. It may be pointed out that the tree grows by the action of its deep root-system, but its fruiting capacity is mostly dependant on the action of the superficial roots. A tree deprived too severely of its superficial roots is apt to become more or less barren, until the superficial roots are reproduced. Pear-trees, apple-trees, quinces and plums may be transplanted safely even if they are still in leaf, provided that the foliage is stripped off leaving only the terminal leaf on each shoot. Thus transplanted, these trees will form new roots at once, and become well established before spring.



Winter vegetables may be grown in the orchard, if there are sufficient open spaces between the trees, and the vegetables are of a nature as to be ready for use not later than March, when the buds of fruit-trees begin to move.

Beans and peas agree best with the orchard on account of the fertilizing effect on the soil caused by the tubercles of their roots; but other vegetables can be grown successfully especially if the orchard has been manured that year or the year before. However, cauliflowers and cabbages should be avoided or planted very sparingly, and chick-peas which are sometimes grown as a vegetable are notoriously injurious to the roots of trees.

## NOVEMBER.

### FLOWER-GARDEN.

**S**PRING annuals, especially the earlier ones such as Cineraria, Pansies, Phlox, Calendula, Omphalodes etc. should be planted out in beds properly worked and manured. Raised beds are very recommendable as they keep off any excess of moisture and may be made use of for hardening young seedlings of spring annuals before planting out in their final place. The rock garden should also receive its due share of attention, Alpine plants and rock-plants sown or planted in suitable places, and the greatest care taken to give to the rockery a natural and picturesque appearance. Here the gardener has to imitate nature, and his art is to leave no visible traces of his art. Rockeries are rarely seen in Malta, and this is perhaps owing to the fact that during winter and spring all valleys and ravines are one continuous rockery, teeming with the prettiest gems of nature. Many Alpine perennials will do well here notwithstanding the heat of summer, such are *Arabis alpina*, *Gazania*, *Payonia*, *Dianella*, *Campanula fragilis*, *C.*

*Rapunculus*, *Aubretia deltoidea*, *Lychnis calcedonica*, *Oenothera pumila*, *Plumbago Larpentae*, *Trachelium coeruleum*, *Cuphaea bicolor*, *Bellis perennis*. Many local plants, such as the terrestrial Orchids, *Erica multiflora*, *Anthyllis Hermanniae*, *Lotus creticus*, *Medicago lupulina*, *Alyssum maritimum*, *Putoria calabrica*, *Capparis rupestris*, *Lathyrus Cicera*, *Sedum nicaense*, *Sempervivum arboreum*, *Linaria Cymbalaria*, *L. triphylla*, *L. chalepensis*, *Rubia peregrina* and many other species deserve a place in any rockery.

Water-plants should now be interfered with as little as possible; but certain delicate species such the more tender *Nymphæas* and *Nelumbium speciosum* must be taken out of the pond and kept comparatively dry until spring. *Eichornia* (*Pontederia*) *crassipes*, the beautiful water-hyacinth, which grows luxuriantly during summer, requires a sunny and sheltered corner in the cold months.

Camellias, Azaleas, Gardenias and Rododendrons may now be shifted from one pot into another without injury. As regards Gardenias the operation may be deferred until spring, and it is always advisable to give them the shelter of a sunny greenhouse during the winter. Good fresh mould, mixed with sand, should be used for potting these plants. Many hardy ornamental and flowering plants can be shifted from one pot into another, or planted out in the garden, now and throughout the winter. Chrysanthemums are now in bloom, and along with late Dahlias are the last stand of the flower-garden against the advancing winter. However, autumn roses are now a glorious show, if they have been at all properly treated in September-October. All spring and early summer flowering bulbs should be planted out before the end of this month.

On rainy days turn and prepare vegetable mould for ordinary pot plants and the hardier ferns, making use of dry leaves, plants and sweepings of the garden. It is very objectionable to work the land, or plant seedlings of annuals in wet weather; our red soils if worked when too wet, become unfit for proper cultivation until next autumn.

## GREENHOUSE.

**F**ERNS may be shifted from one pot into another, and propagated by dividing the rootstock, and this operation should not be delayed later than January. Fern-spores may be sown by scattering them on moist evenly-laid soil in a shallow pot or pan. Scrapings from moss-covered walls make a good soil, but no manure should be added. Constant moisture and an even temperature are requisite, and as soon as the surface of the soil gets covered with a thin layer of blackish algae or low mosses, the prothalli of the ferns make their appearance. This usually happens throughout the winter and early spring. Ornamental-leaves plants should be watered as little as possible. Bouvardias, Saintpaulia, Streptocarpus etc., require shelter in the greenhouse close to the glass.

Many fine Orchids are in bloom; such as *Cattleya labiata autumnalis*, *Oncidium Rogersii*, *O. macranthum*, *Dendrobiums*, *Cypripediums* etc., but those Orchids which have bloomed in summer are now entering their resting season, and should be watered very sparingly and not interfered with in any way. Hanging the baskets of Orchids close to the glass is a good practice to help them to go well through the winter.

## KITCHEN-GARDEN.

**A**LL plants in the seed-bed, if strong enough, should be planted out, unless meant to arrive to maturity in the seed-bed. Towards the end of the month or early in December, peas and beans will be sown which will not suffer much from the ravages of the broom-rape. Spring and summer vegetables, cauliflowers, cabbages, broccoli and kohlrabi should be sown; such summer vegetables as aubergines and capsicums must be sown in a frame, and kept in a sunny place during winter, to have strong plants for early vegetables next spring. Turnips, beets, radish, celeriac, carrots and parsnips

may be sown towards the end of the month for a late crop. Pack in straw or earth up to bleach, early cardoons, celery and leek, as soon as they have reached a convenient size. Plant out endive, chicory, lettuce, alkekengi. Sweet potatoes and irrigated winter potatoes may be taken up. Plant cuttings or suckers of sage, sweet and pot marjoram, thyme, spear-mint, pepper-mint, sorrel, hyssop, balm, tarragon wormwood etc. Strawberries may be planted out in November-January, in beds well tilled and manured. A strawberry-bed, with proper attention, should last for about three years. In renewing strawberry-beds, a sunny well-drained bed should be selected, and not on the same site on which the former beds had stood, before the lapse of at least three years.

## ORCHARD.

**T**HE orange-grove is mellowing its precious burden, but oranges are not fully ripe before February. The sweet-orange however, can be used by those who like it. All other winter-keeping fruits such as pears and apples have been taken in by this time, but the very late ripening pears such as Bergamote Esperen, La France, St. Germain d'hiver, etc., should not be picked off before the middle of November. The pomegranate is fully ripe, and on account of its keeping qualities and fine appearance for the table should be more valued than it is at present. The fruit store should be inspected daily and all rotten fruit removed. Dampness, too much light, and strong draughts injure the keeping quality of most fruits. The kaki or Japanese persimmon are ripening, and later on, the fruit hanging on the bare branches presents a most interesting sight. The kaki is a good dessert fruit, notwithstanding its somewhat resinous after-taste and as it grows well here there is no reason why it should not be more frequently cultivated. Unfortunately the fruit is liable to the attacks of the fruit-fly, and must be protected by putting in small bags about the time when it commences to mellow. It should be eaten over-ripe. Young-kaki trees can be transplanted in December-February.

Olives are ripening and should be gathered in without delay, to prevent waste and deterioration. Pruning of vines, stone-fruits, fig-trees, pomegranates, and all other leaf-shedding trees may be commenced soon after the leaves are shed.

## DECEMBER.

### FLOWER GARDEN.

**M**OST spring annuals should be planted out before the end of this month, excepting such as are meant for late spring blooming. Raised beds are very useful for tender annuals, which are liable to suffer from an excess of moisture. However, such spring flowers as *Coreopsis*, *Scabiosa*, *Statice*, *Sedums*, *Poppies* etc. will not give much trouble, as they do well anywhere. Some spring annuals, such as *Cineraria*, *Senecio*, *Pansies*, *Nemophila*, annual *Campanulas*, bedding *Calceolaria* etc. will suffer if planted in full sunshine or in too open places, as they prefer the half-shade of trees. Before planting annuals, the ground must be deeply dug and manured. Too much manure supplied to the plants when quite young is apt to cause them to develop too much foliage to the detriment of the flowers. For these spring flowers, and especially for *Cineraria*, the garden-mould obtained from garden sweepings, refuse and dry leaves, properly fermented, is an excellent material to add to the soil, to be lightly dug in, before planting.

Plant borders and edgings of *Myrtle*, *Santolina*, *Buxus*, *Pyrethrum*, *Salvia*, *Rosemary* etc. Give the first shift to young rooted plants of *Carnations* raised from cuttings in October. Seedlings of *Carnations* may be also planted out in borders, or singly in pots. *Carnations* grown in pots require good red earth mixed with well-rotted manure and with some sand; the pot must be well drained and placed in a dry sunny

place in the garden. Many perennials grown in pots, and especially *Carnations*, are liable to suffer in summer owing to their roots getting in contact with the overheated sides of the pot. To avoid this danger, the pots may then be removed to a half-shaded place, or put in a larger pot or buried in the earth. In any case the pot should be well drained, and during the winter and spring, placed in a dry sunny and open place in the garden.

This is a busy time for rose-growers. *Roses* can be transplanted with or without a ball of earth, pruned and manured; cuttings planted, or wild roses such as the briar, the dog-rose, the everflowering rose etc. grafted with good or desirable varieties. *Geraniums* are growing fast, and with judicious topping should be made to assume a round shape, which greatly enhances the effect, when the plant is in bloom. Those grown in pots ought to be repotted with a mixture of good red soil, manure and sand, and trimmed down to shape. Tubers of *Dahlias* and bulbs of *tuberoses* should be dug up and kept in a dry place until spring. Perennial grasses, such as *Gynerium*, *Andropogon*, *Pennisetum*, *Eulalia*, *Mischanthus*, *Stipa pennata*, and the *Cyperaceae* or sedges such as *Cyperus alternifolius*, *C. Papyrus*, *Isolepis gracilis* etc. can be transplanted or propagated by dividing the rootstock. Spring and early summer-flowering herbaceous perennials generally, can be dealt with in the same manner.

### GREENHOUSE.

**A**S ornamental foliage plants are waning, a few choice Zonal *Pelargoniums*, *Libonia floribunda*, *Peristrophe speciosa*, *Bouvardias* and *Primulas* will show life and colour if entered in the greenhouse, where they will grow and flower better than in the open air. Towards the end of the month, *Primula sinensis*, *P. obconica*, *Primula malachoides* etc. will commence blooming. Pick off dead, dying, or mouldy leaves and keep the floor and shelves clean. Cleanliness is particularly necessary for greenhouse plants during winter. Give water sparingly,

and where possible make use of the warmer water from wells and covered reservoirs, avoiding the cold water of the ponds. This month is very unfavourable for the propagation of greenhouse plants generally, with the exception of ferns, and all that can be done now and until March, is to keep alive until spring the young plants not strong enough to bear unaided the severe weather of this and the next three months.

### KITCHEN-GARDEN.

**M**OST winter vegetables are ready for use. General cultivation may be continued on the same lines as last month. Except in very favourable situations, summer and autumn vegetable marrows are dying off, and in their stead the black-seeded marrow or gourd (*Cucurbita melanosperma*), will supply this tender vegetable during winter and until April. Late autumn and winter tomatoes, planted out in September, are now ripening, and will be keenly appreciated in the kitchen. Spring potatoes may be planted in a sheltered place for an early crop. Towards the end of this month, sow capsicums, tomatoes, chillies aubergines and other early summer vegetables, in a bed well supplied with half-fermented manure and placed along a sunny and sheltered wall. Sow beans and peas for a late crop. Plant out onions, and sow onions if spring onions or small onions for pickling are required. Artichokes should be dug and manured a second time for the production of large heads. Winter varieties of lettuce, and late cabbages and kohlrabi may be planted.

Before long the cabbage-butterfly will be seen hovering over plants of the cabbage-tribe: catch and destroy as many as possible, and seek out and destroy the clusters of yellow eggs of this insect on the under surface of the leaf.

### ORCHARD.

**N**URSERY work is now in full swing. Plant cuttings of vines, figs, black mulberries, quinces, apples, hawthorn, and pomegranate; and transplant plants or suckers of almonds, wild plum, wild pear and wild cherry, to be used as grafting stock. Graft peaches, nectarines and plums on bitter or sweet almonds; graft pears on quince, wild pear and hawthorn; graft apples on own seedlings, or suckers, on the crab or paradise stock and on hawthorn; graft apricots on seedlings or on wild plum; graft cherries on the Mahaleb cherry or on the hautbois cherry. Vines can be grafted, and almonds, nectarines, peaches, plums and walnuts sown. Deciduous fruit trees can be transplanted safely without any ball of earth; in planting care should be taken to place the neck of the stem as low down as its former level, and the branches trimmed down to convenient size, leaving only strong spurs with new wood, but the roots must be treated with great care, and no large wounds made on the stem, roots and branches. The roots should be spread evenly all round in a pit of sufficient size, without over-crowding, the soil being filled in and pressed down firmly. Some old manure should be supplied to each tree, but it should not be put in immediate contact with the roots.